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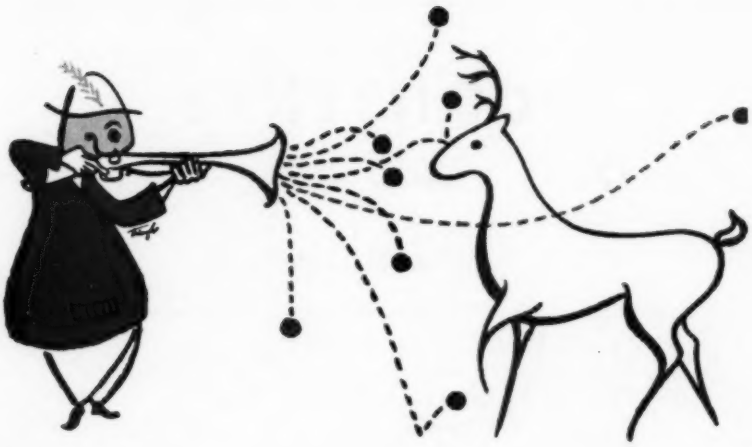

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EDITORIAL STAFF: W. A. Aitken, *Editor Emeritus;* Donald A. Price, *Editor in Chief;* H. E. Kingman, Jr., *Managing Editor;* Eva G. Bailey, *Assistant to the Editors.*

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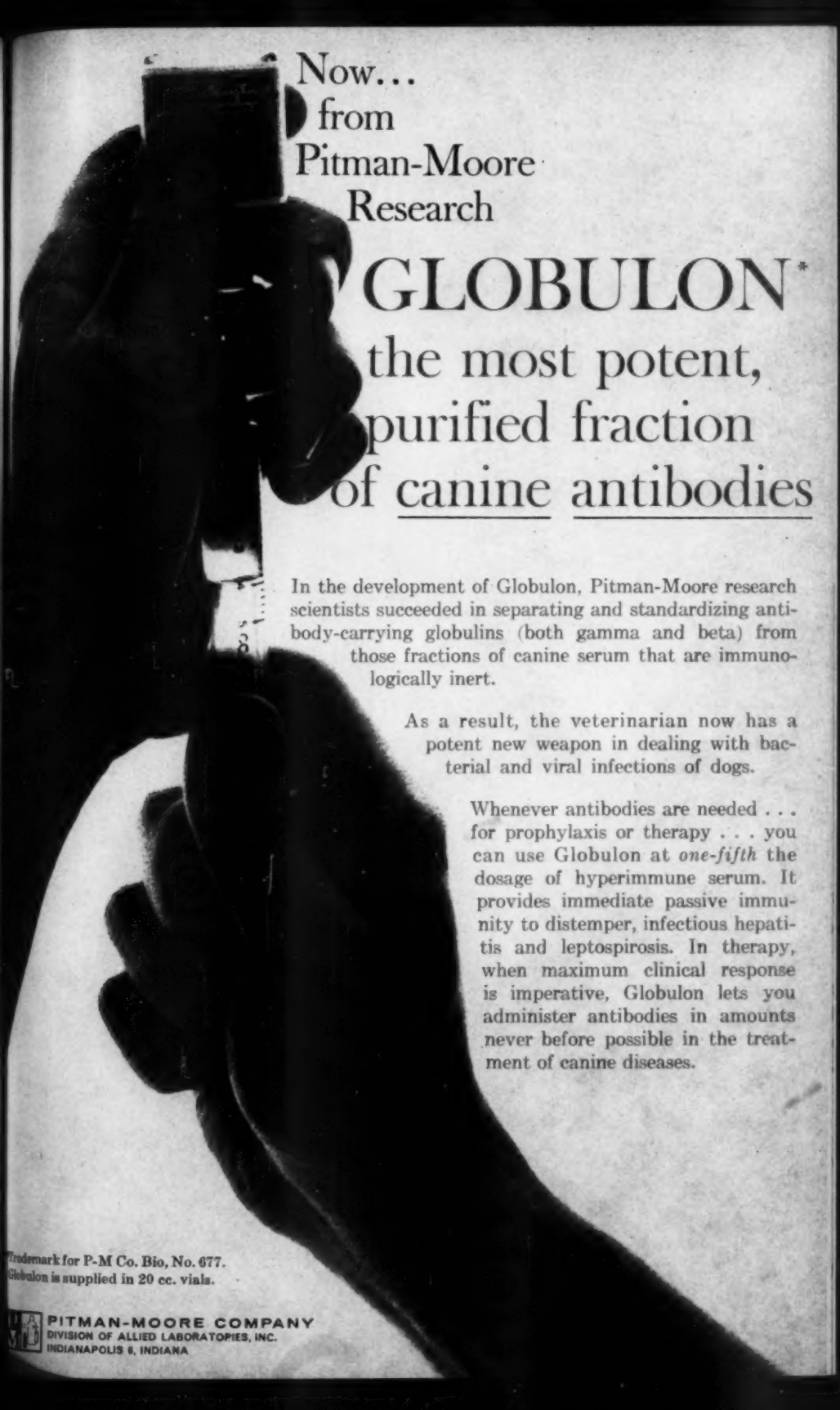

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The "Vet" Says:

Teat Injuries

CLEANLINESS is the most important part of any treatment for teat injuries, since dirt is full of germs. Then a teat can be considered as a tube, and germs that get into it can easily ascend into the udder to cause mastitis. Accordingly, the first step in treatment consists of cleaning up the wound.

Warm water containing a mild antiseptic can be used, or hydrogen peroxide can be applied after the wound has been washed out with the antiseptic solution. A few pinches of cotton will be handy for gentle swabbing of the injury. Strong disinfectants like lysol aren't recommended for open wounds because they have a tendency to destroy tissue. After the wound has been cleaned, it can be blotted dry with cotton or new strainer pads. The next step will depend on the type of wound.

When teats are cut on the sides without the milk duct being opened, treatment is concerned with bringing the wound edges together so healing will occur faster. But cases may call for the services of a veterinarian to close the cut with stitches or metal clips made especially for this purpose.

Simpler cases may be treated by the owner, with wound edges being pinched together and then held there by strips of adhesive tape applied around the teat. Minor cuts may not require bandaging, but more extensive ones should be covered with gauze under adhesive tape. In such cases, it's important to leave the end of the teat uncovered to permit milking. The use of a milk tube may be indicated for a week or so to avoid squeezing of the teat while it is healing. As an alternative, a special type of plastic tube may be inserted in the teat. This is left in the teat all during the healing period, with a cap being unscrewed at milking time to drain out the milk. Mastitis ointment should be injected into the quarter every day during the healing period.

WHEN the end of the teat is injured and part of it is left dangling, it will usually be best to clip it off. The teat may look unfit for a while, but it will probably be about as good as ever by the next freshening time. In such cases, gauze may be folded into a small square to cover the wound, and held in place by two strips of tape laid across it at right angles to each other with the ends running up the sides of the teat. The bandage can be removed for milking by untying the tape, and a new one applied afterward. Mastitis ointment can be applied to the raw surface every day to aid healing.

When teat cuts open the milk duct, a veterinarian should be consulted. This is because the treatment of these injuries begins with cleaning the duct with dilutions of disinfectant, often including the teat canal. Otherwise, an open teat duct usually means trouble with a fatality remaining the likely result. However, when the duct of the teat is closed, almost healing of the wound is assured.

When teats aren't damaged, but are simply badly chapped or irritated, they often respond to treatment with ointments containing boric acid. Other cases of teat injuries may require the services of a veterinarian. Milk tubes are sometimes used in the treatment of teat injuries, and in this type of treatment

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Daily Drovers Telegram • Daily Journal Stockman
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Ohio Farmer • Missouri Ruralist • Prairie Farmer • The Farmer
Wallaces Farmer • Nebraska Farmer

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Correspondence

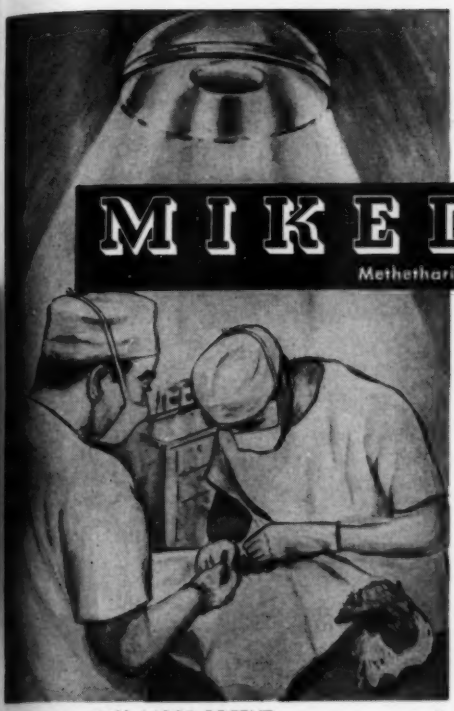
August 19, 1959

To the Editors:

Enclosed is a radiograph of a pelvis of a German Shepherd Dog bitch taken at 8 months of age. I believe the acetabulums are deeper and of slightly more desirable formation than the ones illustrated as normal in "What Is Your Diagnosis?", adv. page 29 of the August 15 issue of the JOURNAL. This radiograph shows the best formed set of hip joints I have encountered for the German Shepherd Dog.

Radiograph of German Shepherd Dog bitch.

Sincerely,
Dr. J. G. SNAVELY, M.D.
Toledo, Ohio



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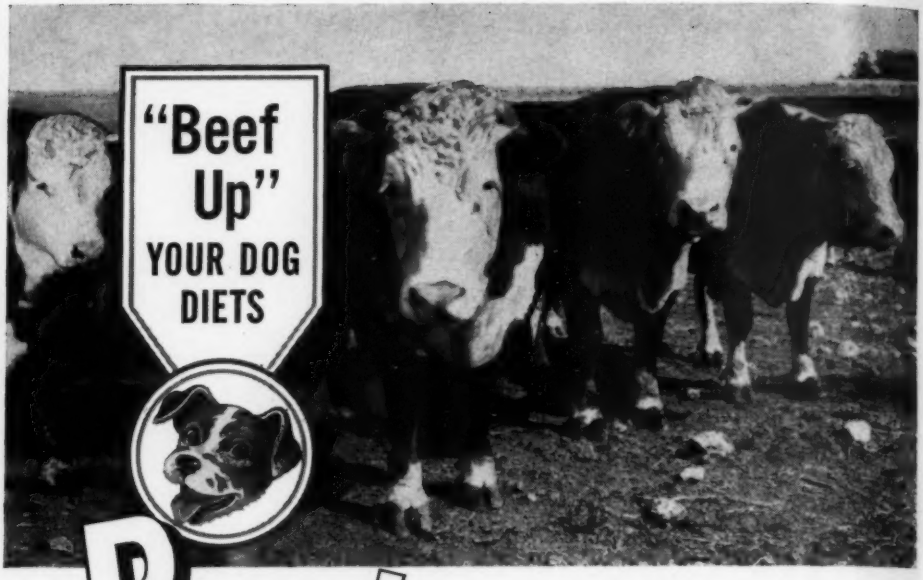

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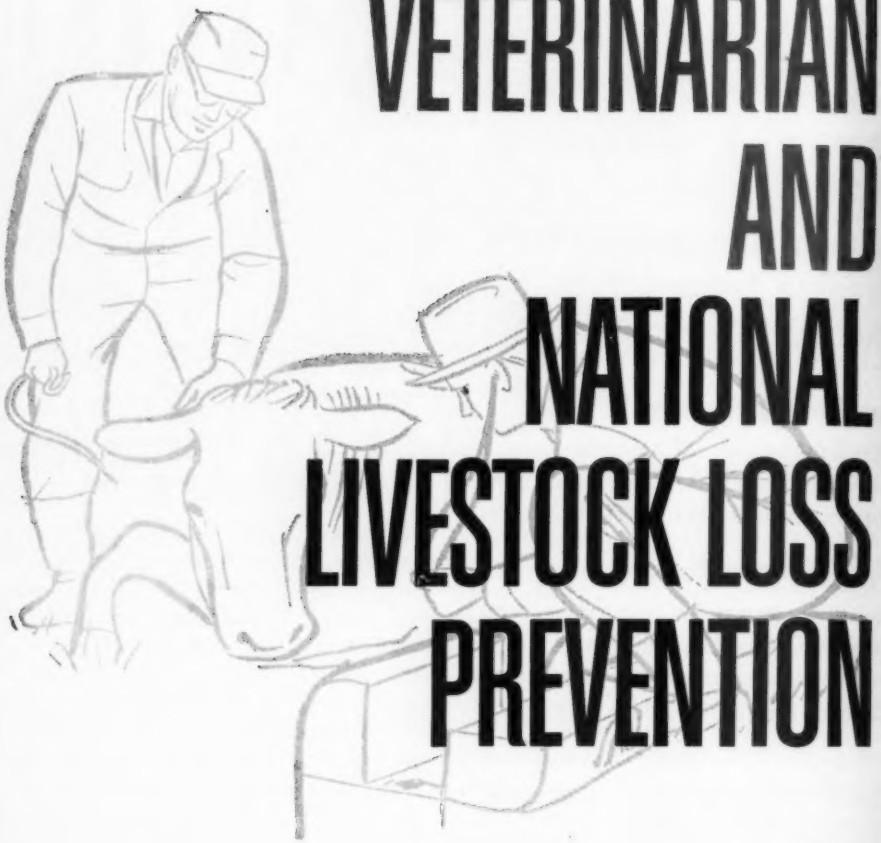

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news from Washington . . .

FROM THE AVMA WASHINGTON OFFICE

LEGISLATION

H.R. 6436 Becomes Law

The amended Federal Insecticide, Fungicide and Rodenticide Act, H.R. 6436 (see JOURNAL, Sept. 1, 1959, adv. p. 12) became Public Law 86-139, August 7, 1959.

Senate Committee Hearing Tax Bills Concluded

Senate Finance Committee concluded hearings on Keogh-Simpson, Smathers, tax-deferment self-employed bills, H.R. 10 and S. 1979, on August 11 (see JOURNAL, Aug. 15, 1959, adv. p. 16).

National Wildlife Disease Laboratory

National Wildlife Disease Laboratory, S. 2086 (see JOURNAL, July 1, 1959, adv. p. 14), favorably reported with amendment on August 13, by Senate Committee on Interstate and Foreign Commerce.

International Food for Peace Act

International Food for Peace Act of 1959, S. 1711, reported favorably with amendments by Senate Foreign Relations Committee.

"Research in C.B.R."

House Committee on Science and Astronautics filed a report August 10, entitled "Research in C.B.R." (Chemical, Biological, and Radiological Warfare), H. Report 815.

Air Pollution Control

Subcommittee on Health and Safety, House Committee Interstate and Foreign Commerce, ordered H.R. 7476 favorably reported to full committee, to extend for two years the authority of Surgeon General P.H.S. with respect to air pollution control.

Horsepower vs. Wild Horses

House Judiciary Committee, August 11, reported favorably on H.R. 2725, a bill to prohibit use of aircraft or motor vehicles to hunt wild horses or burros on land belonging to the United States.

NEW BILLS

Food Color Additives

S. 2505, Sen. Symington (D., Mo.), to amend Federal Food and Drug Act, to permit temporary listing and F.D.C. certification of Yellow No. 3 and 4 for coloring edible fats under tolerances found safe by the Secretary of H.E.W., pending congressional enactment of general legislation for listing and certification of food color additives.

Pork Products

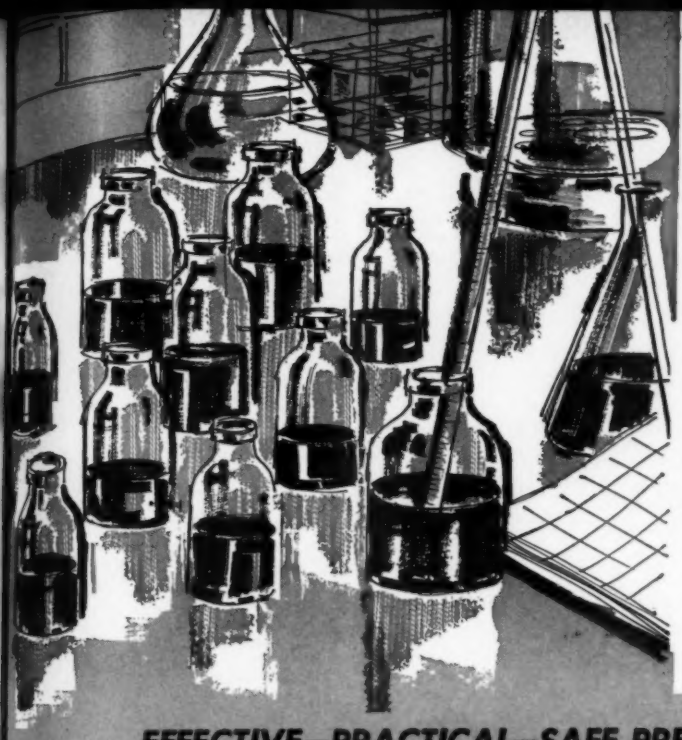
To assure orderly marketing of hogs and pork products; encourage domestic consumption pork and pork products; maintain productive capacity hog-farming industry, etc.: H.R. 8394, Rep. Hogan (D., Ind.).

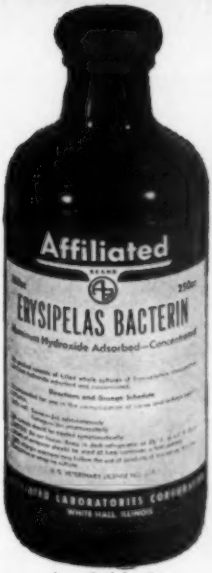
Poultry Marketing

To provide for stabilization and orderly marketing in the poultry industry: H.R. 8482, Rep. Bowles (D., Conn.).

Social Security Amendments

1) To provide for refund of social security taxes paid by a person who is ineligible for O.A.S.I. benefits on attaining retirement age: H.R. 8621. (2) To provide voluntary coverage under O.A.S.I. for self-employed physicians: H.R. 8620. Both are by Rep. Flood (D., Pa.).





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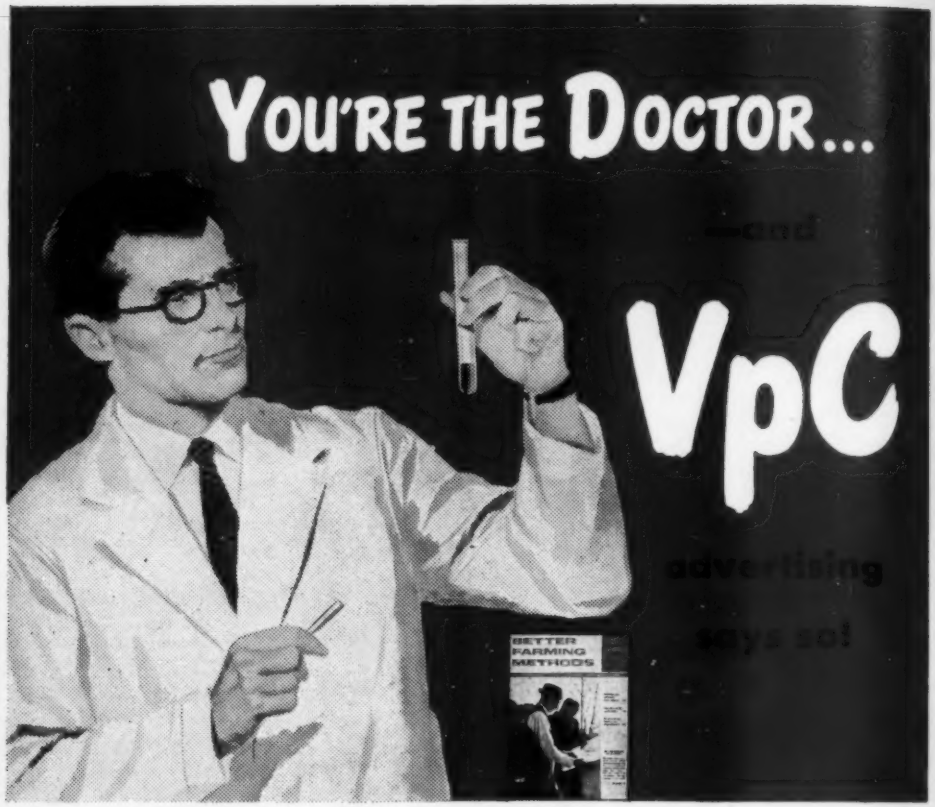

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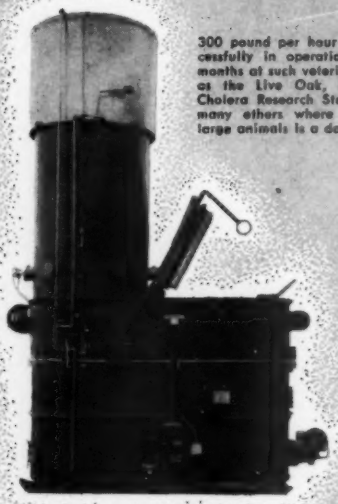

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Rural or Urban Backgrounds: The Effect on Veterinary and Pre-Veterinary Medicine Attainment

ARVO E. JUOLA, Ph.D.

East Lansing, Michigan

A RECURRING PROBLEM among schools of veterinary medicine, particularly schools in agricultural states, is the establishment of a satisfactory balance of students from rural and urban backgrounds. Of particular concern is the possible ultimate effect of a disproportionate rural-urban composition on the future supply of small versus large animal practitioners. This problem became of immediate concern at MSU when a study was made which suggested the utility of pre-veterinary academic records in future selection programs.[1]

Since it is generally assumed that the undergraduate attainment of students with rural backgrounds is not as high as the attainment of students with urban backgrounds, it was feared that a uniform application of the academic record in selecting veterinary medical (VM) students could result in future classes which consist predominantly of students with urban backgrounds.

To approach this problem, students who graduated from the Michigan State University College of Veterinary Medicine in the years 1957 and 1958 were classified into rural or urban groups on the basis of answers to relevant questions on the VM application form completed four years earlier. On this form, students are asked whether they have lived on a farm or worked on a farm, and how long, as well as whether they have had any experience in 4-H work or vocational agriculture. These responses were sufficient to make a satisfactory rural-urban distinction for 108 of the 109 students on whom application forms were available. Of the 108 students, 53 were classified as having essentially a rural background while 55 were classified as having predominantly an urban background. Grade-point averages (GPA) in pre-professional and professional courses were then computed for each student. The total pre-VM GPA and the average GPA in physics and chemistry were used as indexes of pre-professional attainment.* The total four-year VM GPA and the last two-year VM GPA were used as indexes of attainment in the professional school.

THE FINDINGS

The mean (average) GPA'S of both the rural and urban group are presented (table 1) along with the mean GPA for the entire sample of 108 students. The mean GPA's of rural and urban students, when a further classification was made into students who obtained all of their pre-VM work at MSU and students who transferred to MSU from some other collegiate institution, are also presented (table 2). Since complete academic records were not generally available for all transfer students, the total pre-VM GPA was excluded from computations for the transfer group.

The physics-chemistry GPA'S (table 1)

Dr. Juola is assistant professor, Office of Evaluation Services, Michigan State University, East Lansing.

The author acknowledges the helpful suggestions and cooperation of Dr. Paul Dressel, director, Office of Evaluation Services, and Dean Willis W. Armistead and the Committee on Selection of the College of Veterinary Medicine, Michigan State University.

[1]Juola, A. E.: The Relationship Between Academic Attainment in Pre-Veterinary Medicine and Success in Veterinary Medicine. J.A.V.M.A., 135, (Sept. 15, 1959)

*The two pre-VM GPA's used were the measures of attainment which best predicted the later success of students in the College of Veterinary Medicine at MSU.

TABLE 1—Average Grade Point Average (GPA) Secured by Students Classified as Having Rural or Urban Backgrounds

Classification	No.	Physics-Chemistry GPA	Total VM GPA	Last 2-year VM GPA
Rural	53	2.64	2.85	2.92
Urban	55	2.73	2.74	2.85
Totals	108	2.69	2.79	2.88

indicate that the rural group's pre-VM attainment was slightly inferior to that of the urban group. The total pre-VM GPA's of the regular students (table 2) reflect the same pattern as does the pre-VM attainment in physics and chemistry. The physics-chemistry GPA'S of the rural and urban transfer students are almost identical, although both of these averages are lower than the GPA means of the regular MSU student groups. When tested for significance by use of analysis of variance, the differences among the four physics-chemistry averages presented in table 2 were not large enough to be considered statistically significant.**

The relative attainment of the rural and urban groups in veterinary medicine pre-

TABLE 2—Average Grade Point Average (GPA) Secured by Regular (Nontransfer) and Transfer Students Classified as Having Rural or Urban Backgrounds

Classification	No.	Total pre-VM GPA	Physics-chemistry GPA	Total VM GPA	Last 2-year VM GPA
Regular MSU—rural	34	2.78	2.68	2.83	2.90
Regular MSU—urban	30	3.02	2.87	2.79	2.95
Transfers—rural	19	.....	2.57	2.88	2.95
Transfers—urban	25	.....	2.56	2.68	2.73

sents a contrasting picture. While the pre-VM academic records indicate that the rural group may be somewhat inferior, the VM GPA'S favor the rural group. This trend is evident in table 2 which presents the patterns for regular and transfer students independently. For the regular MSU students, both the mean pre-VM GPA and the mean physics-chemistry GPA of the rural group are approximately 0.2 of a grade point lower than those of the urban group, but the two VM GPA's are approximately the same. For the transfer students, the mean pre-VM physics-chemistry GPA's of the two groups are about equal, but the two VM GPA's favor the rural group by approximately 0.2 of a grade point.

It appears that in comparison to students with urban backgrounds, the relative attainment of students with rural backgrounds is somewhat higher in veterinary medicine than is indicated by their attainment in regular pre-VM courses. A test of the significance of this difference was made by analysis of covariance, using the physics-chemistry grades as the control variable, and total VM grades as the experimental variable. This analysis showed the difference favoring the rural group to be statistically significant. This means that when adjustments were made to match the pre-VM attainment of the rural and urban groups, the rural group performed at a higher level in veterinary medicine.

DISCUSSION

The apprehension of the committee on selection, for veterinary medical students at MSU, toward treating applicants with rural backgrounds exactly the same as applicants with urban backgrounds appears to be justified. While the differences in pre-VM attainment between rural and urban groups were not statistically significant, the academic attainment of the rural group was not as high. When the academic attainment of these two groups in VM was considered, the findings indicate that having a rural background is more of an asset than a handicap. It would, therefore, seem advisable to consider seriously the ultimate effect on the student body of any uniform application of pre-VM attainment standards (or possibly even standards on an aptitude test) in student selection.

Reasons for the relatively superior attainment of the rural group are of interest. One may speculate that the content of courses in VM may be such that a rural background is of material advantage in the VM program. Motivational factors may also be relevant. Possibly the students with a background in agriculture are more stimulated by VM courses. It may also be that both groups are stimulated in VM but the rural group was not stimulated by the pre-VM courses. It can also be that the college preparatory function of rural high schools is not equal to that of urban high schools, but that two or three years of college work

**The 0.05 level of significance was used for all tests of significance. "Statistically significant" then means that differences such as those obtained could be expected to occur by chance only 5 times out of 100.

enables the rural group to make a satisfactory adjustment.

SUMMARY

On the basis of responses to questions on an application form completed prior to admission to the Michigan State University College of Veterinary Medicine, 53 students from the graduating classes of 1957 and 1958 were classified as having essentially a rural background while 55 students were classified as having predominantly an urban background.

When the academic attainments of the two groups were compared, nonsignificant differences were found favoring the urban group in pre-veterinary medicine (VM) attainment but favoring the rural group in professional VM attainment. After adjustments were made to equate the pre-VM attainment of students in the two groups, the professional course grade point average (GPA) of the rural group was significantly higher than that of the urban group.

Synovia Changes During Therapy

Changes in the synovial fluid of 57 knee joints in man were studied during intra-articular therapy with weekly injections of prednisolone trimethylacetate, a new steroid compound. In most cases of rheumatoid arthritis, the fluid was usually watery, pale yellow, and turbid, containing fibrin flakes and clotting on standing. The cell content was high and polymorphonuclear cells predominated. A typical response to this therapy was progressive reduction in volume of effusion and increased viscosity.

The cell count dropped from an initial average of 6,936/cmm. (range 1,000 to 36,000) in every case to an average of 1,163/cmm. The greatest drop was in polymorphonuclear cells. The protein content dropped from an average of 4.4 to 3.4 Gm./100 ml. while the albumin increased from 40 per cent (range 30.5 to 67.7% to 50.8 per cent. The local action of this steroid was superior to that of others used.—*Brit. Med. J. (May 16, 1959): 1271.*

Staphylococcic Pneumonia in Man

Despite the concern regarding staphylococcic infections, the incidence of primary staphylococcic pneumonia is apparently no greater now than prior to the development of antibiotics. The most satisfactory treatment seems to be with chloramphenicol plus erythromycin, novobiocin plus erythromycin, or a combination of all three antibiotics.—*J.Am.M.A. (June 6, 1959): 638.*

Rinderpest in Imported Meat

An instance is cited, in 1918, where rinderpest occurred in Italy in cattle kept on premises where wrappers from frozen meat, imported from the Philippines by the British army, had been deposited. Immediate slaughter of all exposed and nearby cattle and strict sanitary measures eliminated the disease.—*Vet. Bull. (May, 1959): Item 1403.*

Australia Bans Importation of Ruminants Due to Bluetongue Threat

For an indefinite period, starting in 1958, Australia has prohibited importation of all ruminants in an effort to prevent the introduction of bluetongue disease. This includes ruminants for zoological gardens.—*Vet. Bull. (June, 1959): Item 1771.*

Livestock Economics

The estimated number of swine to be raised in the United States during 1959 is 104,494,000, approximately as many as in 1942. This total has been exceeded only in 1943, the peak war year when a substantial portion of the 121,807,000 raised were shipped to allied powers. The 1959 estimate is almost 10,000,000 more than were raised in 1958.—*Livestock and Meat Situation, U.S.D.A., July 7, 1959.*

Sarcomatous Enteritis in a Cow

A 10-year-old cow died, in Russia, after a month of illness characterized by diarrhea and anorexia. Swellings in the wall of the rumen and of the small intestine, with constriction of the lumen of the latter, proved histologically to be round-cell sarcomas.—*Vet. Bull. (April, 1959): Item*

Lead Poisoning in a Dog

A case of chronic lead poisoning in a dog which, for seven years, had been a watch dog for a printer's workshop is reported. The findings were similar to those of the condition in man.—*Vet. Bull. (May, 1959): Item 1548.*

The Veterinarian and Our Changing Agriculture

SHERWOOD O. BERG, Ph.D.

St. Paul, Minnesota

MOST OF US are aware of the revolution in agricultural technology that has swept this country with devastating speed in our lifetime. What we have witnessed may be compared with the industrial revolution which began near the close of the eighteenth century. Within the memory of our present generation of farmers, almost every agricultural operation has been changed or displaced.[4] It is interesting to take a closer look at the scientific and technological changes we have experienced in our generation: Output per worker has doubled in the last 20 years; farm output per unit of total resources has increased 50 per cent from 1920 to 1955; more than 1.5 million, or about one fourth of our farms, have disappeared from American agriculture since 1929; the average size of farms in the United States has increased from 157 acres in 1929 to 242 acres in 1954—an over-all increase of over 50 per cent; tractor and motor truck numbers have tripled since 1940; and much of the hard work and drudgery of farming has been removed as production practices have been modified and the time consumed doing farm operations has been decreased.[1]

The march of events has contributed significantly to the changes in rural living. These changes have helped to provide relatively cheaper food and raw materials; have released manpower needed in industry; and have increased the general welfare of our country. However, these changes in farm production practices have also raised new and difficult problems. They are reflected in new methods of marketing and distribution. They call for a major adjustment of agriculture to other sectors of the economy. Naturally, these adjustments have important implications for veterinarians as members of a profession closely allied to the agricultural industry.

One of the most important challenges facing veterinarians, as a result of the changed situation within agriculture, is the advent of a phenomenon called "economic" or "vertical" integration. As developments in economic integration have unfolded, they have had a particular impact upon the livestock-feed economy.

ECONOMIC INTEGRATION IN AGRICULTURE

One of the major forces, then, disturbing the existing status quo in agriculture is vertical integration. One of the questions we ask is: What do some of the problems associated with vertical integration mean to the practicing veterinarian?

Perhaps not since the days when tractors replaced horses have veterinarians been faced with such an important change. Therefore, I would like to examine three facets of this development: (1) changes which have taken place in the livestock and poultry industry; (2) some economic and social implications which are by-products of the integration process; and (3) how these changes might affect the veterinary profession.

DEVELOPMENTS TO DATE

Economic integration, or vertical integration as it is often labelled, is the control by a single firm of two or more stages in the chain of production, processing, and distribution. It may come about by cooperative arrangements, by the use of contracts, or by ownership.

Integration is not new in the livestock industry. Early livestock and meat production and marketing was completely integrated. All the stages in the chain of production, slaughtering, and retailing were done by one man—the farmer. With the growth of a complex society, the market took from the producer all his functions except that of production. Central markets developed at rail points, and with these markets there grew large livestock firms.

With the passage of time, important forces in some areas of agriculture have tended to move producers and marketing

From the Department of Agricultural Economics, University of Minnesota, Minneapolis.

Presented before the Minnesota State Veterinary Medical Society, Sixty-Second Annual Meeting, Minneapolis, Minn., Jan. 27, 1959.

The author acknowledges contributions to this paper by Mr. T. Oyloe, teaching assistant, Department of Agricultural Economics, University of Minnesota, Minneapolis.

agents closer together and away from the central markets. These forces group around the producers, on one hand, and the marketing sector on the other. To these two primary groups we may add feed companies which have been active in stimulating vertical integration, especially in poultry.

What do these three groups (producers, marketing agents, and food dealers) hope to gain by the process of vertical integration? Producers hope vertical integration may spread and reduce risk and production costs. They also hope prices can be improved, new markets more easily established, and production capital made easier to acquire. Marketing agents, slaughterers, and distributors hope by this method to insure an adequate supply of produce. Other areas where improvement might be expected include quality control of farm products, less dependence on central markets for raw products, and reduced costs through the economics of large scale production. The main interest of feed companies in vertical integration stems from a desire to expand the market for their supplies.

Ninety per cent of broiler production is now from integrated programs. There has been a large decline in the number of producers and a large increase in the number of birds per farm. Only 28,000 farms produced 90 per cent of all broilers in the United States in 1954. Half of all turkeys are produced in integrated programs. Three fourths of the major feed companies have such programs.[3]

Only a small percentage of red meat comes from integrated programs. Twenty years ago, few people believed that Delaware, Maryland, and Virginia would ever be important broiler-producing states. We could be on the threshold of a tidal wave of contract production, since similar programs could succeed in certain regions today with red meat production.

Leading the parade in red meat integration might be the swine industry. It is of interest that only 60,000 farms with 100 sows producing two 8-pig litters per year would supply us with 96 million hogs. Our production in the last 12 years has averaged 89 million head. These 60,000 farm units compare with 2.5 million hog farms reported in the 1954 census of agriculture. Two thirds of the major meat packers have integration programs for hogs. The same is true for feed manufacturers. In both cases, some of the progams are experimental and small. Less than 10 per cent of hogs are now coming from integrated programs.[3]

Economic Implications of Integration

There is growing pressure on the combination of owner-manager-operator in one man as the typical pattern of farm operation. Where we have integration, we depart from this pattern of farm operation. True, we have departed from this pattern in the majority of other major business sectors. We are no longer a nation of self-employed people. Of our total personal income of this country, more than two thirds now comes from salaries and wages. Less than one sixth comes from rents, interest, and royalties—payments for ownership of property. Likewise, less than one sixth arises from entrepreneurial income.[2] In this latter group are included farmers, small shop owners, and others.

The percentage of our income from entrepreneurial sources is constantly decreasing. This does not make us a poorer nation. We grow constantly wealthier, in the aggregate and on a per capita basis, as this shift from entrepreneurial to integrated economy progresses. Therefore, we should not at this point automatically condemn as bad for agriculture a change which might be beneficial to the economy.

Another economic feature in this process is that negotiated pricing will tend to displace the present competitive price-making structure. This has already taken place in the case of fruit and vegetables grown under contract for specialized processing, broilers produced under contract, and some feeding contracts for large animals. Bargaining may center around rates of compensation to be paid producers for performing certain tasks in the production process, with selling price determination being left to the skill of the integrator after the production process is completed. In such a situation, the price risk will be shifted from the grower.

The grower's interest will lie in his rate of compensation per unit of product, or per hour, as is the case with much of our broiler production. The real problem will be to compensate him adequately for his work and still maintain the incentive for efficiency and production which he had when he also carried his own entrepre-

neurial risk and had his own capital invested.

VERTICAL INTEGRATION AND THE VETERINARIAN

With the spread of integration, new problems in animal production will arise. There will be increased problems in relation to herd disease control. In fact, a tremendous challenge faces the veterinary profession in this regard. We have mentioned some of the over-all changes which have occurred in American agriculture in recent decades. These have been tremendous. However, one of the bottlenecks has been the slow upturn in the efficiency of production of livestock products.

In the last fifty years, output per man-hour in production of feed and bread grains has increased about 350 per cent; in the production of hay and forage around 140 per cent. However, in the same period of time the efficiency in the production of milk has risen only 25 per cent; in meat production, only 90 per cent. The next important break-through in the science of agriculture may be the joint efforts of the animal geneticist, the animal nutritionist, and the veterinarian. Studies and research will play an important role, but emphasis on disease prevention techniques and the veterinarian's contribution to better livestock management will be most important.

The technical problems will indeed be challenging, but let us also examine the economic implications. Most veterinarians regard themselves as "rugged individualists." This has been exemplified by their strong adherence to a philosophy of *laissez faire* in economics. The probable change in economic and social status of the veterinarian will also be a most difficult adjustment. It is entirely possible that the large integrated enterprises will increasingly employ their own specialists as they already have been doing in certain poultry and dairy industries. This will tend to make the veterinarian an employed specialist. He will become an "organization man" rather than a rugged individualist; he will become part of a smooth-working team of specialists; he, too, will be integrated! He, like others, will work for wages.

It is not my task to pass judgment on the merits or demerits of being self-employed or of working for another. However, these trends in our agricultural economy are rather evident, and it is important to the practicing veterinarian and to the veterinary profession to keep in mind the changes which are occurring and the adjustments which will have to be made to the changing economy. One can not simply stick one's head in the sand or events will pass one by and the veterinarians never will be heard!

SUMMARY AND CONCLUSIONS

Our agriculture has undergone fundamental changes in our lifetime. One of the major changes on the American agricultural scene at the present time is economic integration. The degree of integration varies with the type of livestock industry. Poultry leads the parade with 90 per cent of the birds marketed originating in integrated units. Although integration has not progressed as rapidly in the red meat and dairy industries, changes are under way.

Negotiated pricing is taking the place, in part, of the traditional competitive price-making mechanism. Existing marketing institutions will be under pressure as they are bypassed by increasing quantities of products which will flow directly from producer to retailer.

The veterinarians will face the task of contributing to the solution of technical problems of large-scale production in terms of animal health, sanitation, and the like. Personal economic and social problems of the veterinarian will include, in some cases, the trading of a self-employed position for that of a salaried position. However, change is a necessary mark of progress. As the veterinarians face the future—ever alert to change, ever mindful of the challenge that is theirs—we can look forward to their meeting this economic challenge with confidence, competence, and courage.

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Radiographic Anatomy of the Canine Pectoral Limb. Part II. Developing Limb

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ROENTGENOGRAMS TAKEN during the growth period of an animal may be confusing since an epiphyseal line may sometimes simulate a fracture. This confusion can be obviated if one is familiar with the location of the various centers of ossification and the times of epiphyseal union. In this part of the paper, the skeletal development of the pectoral limb is outlined briefly and the locations of the centers of ossification are illustrated by roentgenograms and tracings.

Early accounts[2,5] of the skeletal development in the dog were given toward the end of the nineteenth century, and it is interesting to note that figures given at that time for epiphyseal union[5] have been quoted recently,[9] and correspond closely with those given in recent editions of two veterinary anatomy textbooks.[1,8]

Since then, the postnatal ossification process has been investigated in 19 dogs from different breeds which were killed at

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The author thanks Drs. D. G. Lee and J. E. Croshaw for their support and advice, and Mr. A. Marfaing for his photographic work.

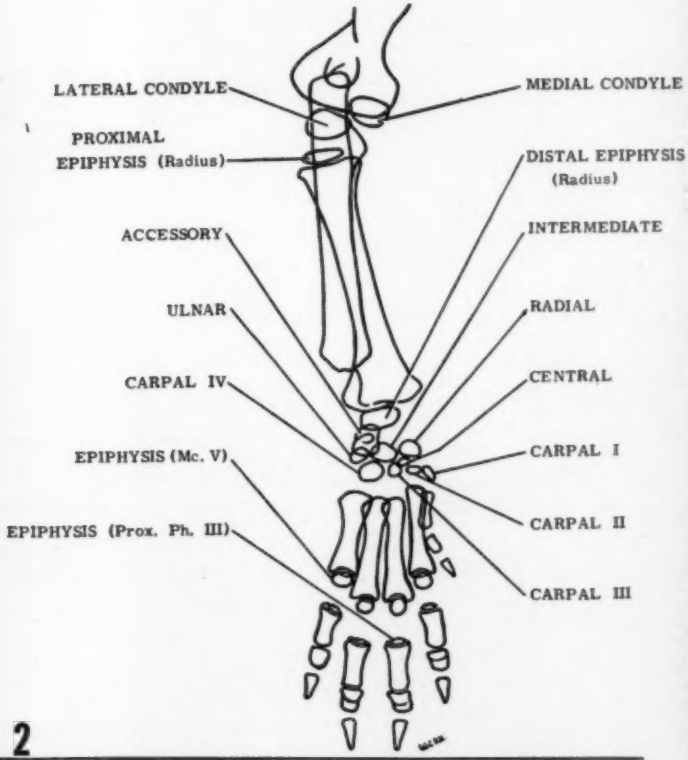


Fig. 1—Dorsoventral view of the right forelimb of a 40-day-old female Scotch Collie.

Fig. 2—Labelled tracing of figure 1.

selected ages,[9] and in the manus of 10 dogs from different breeds by radiographing them at regular intervals.[4] The times of epiphyseal union have also been assessed radiographically in Egyptian Armant dogs.[7] I have studied the appearance of the ossification centers in a total of 17 dogs from four breeds, and the times of epiphyseal union in 8 of those dogs from two breeds, by radiographing them at regular intervals from birth.

From the work that has been done, it can be said that the rate of the ossification process is affected by such factors as nutrition and health, and that it may be influenced by breed and sex. It is also clear that there is need for further work in this field. For this reason, the figures given in this paper should be considered approximate ones. They have been based on my observations and those of other workers for the appearance of the ossification centers[3,4,6] and the times of epiphyseal union.[4,7]

The criterion for the appearance of an ossification center was the appearance of an opaque area on the roentgenogram, and epiphyseal union was considered to have occurred when the epiphyseal plate had disappeared and bony trabeculae could be seen passing from the diaphysis to the epiphysis along the entire length of the epiphyseal line.

The dogs were anesthetized with barbiturates and positioned as described in Part I of the paper.[2]

Ossification Process

The scapula develops from two centers of ossification, one for the body and one for the tuber scapulae. The body is ossified at birth, while the tuber scapulae appears be-

Fig. 3—Mediolateral view of the right shoulder of a 3-month-old Scotch Collie male.

Fig. 4—Labelled tracing of figure 3.

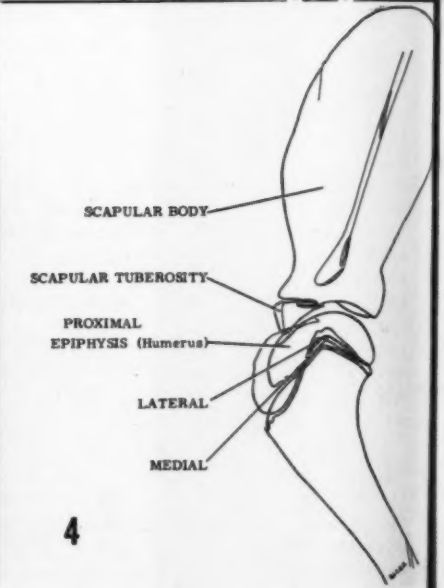


Fig. 5—Ventrodorsal view of the right shoulder of a 4-month-old Scotch Collie female.

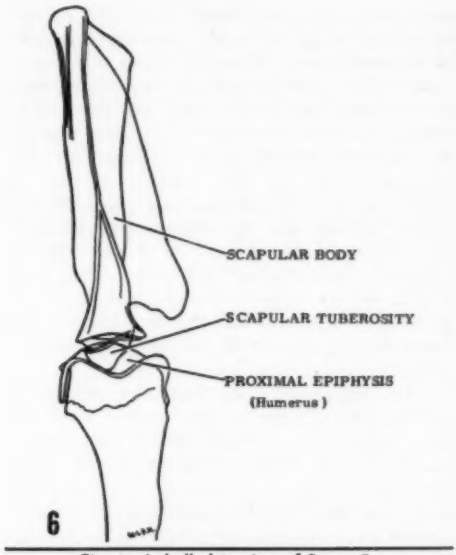


Fig. 6—Labelled tracing of figure 5.

tween the fifth and eighth week and can be seen, on a mediolateral view, lying just cranial to the articular fossa. It soon becomes wedge-shaped (fig. 3, 4), and eventually unites with the body of the bone between 4½ and 6 months.

The humerus develops from five centers of ossification: one for the shaft (diaphysis) which is ossified at birth, one for the head and tubercles (proximal epiphysis), and one each for the medial and lateral condyles and the medial epicondyle. A separate center for the lateral tubercle has been described,[3,7] and the lateral condyle may develop from two centers.[6]

The proximal epiphysis appears during the first two weeks, usually about the seventh day, as an ellipsoid at the proximal end of the diaphysis. In profile, it soon becomes lunate in form with a convex, proximal surface, and a concave, angled, distal surface capping the gable-like proximal end of the diaphysis. The ridge of the gable passes obliquely caudo-mesiad across the end of the diaphysis, and this accounts for the two angles that can be seen on a mediolateral view of the bone (fig. 3, 4). The proximal epiphysis unites with the diaphysis at 10 to 12 months.

The centers for the medial and lateral condyles appear during the second or third week, but the center for the medial epicondyle does not appear until the sixth, seventh, or eighth week. The latter unites with the medial condyle during the sixth month, and the whole distal extremity unites with the shaft during the eighth month.

The radius develops from three centers of ossification: one for the diaphysis which is ossified at birth, and one each for the proximal and distal epiphyses (fig. 1, 2, 7-10). The center for the proximal epiphysis appears during the third, fourth, or fifth week of life, and unites with the diaphysis during the ninth month. The center for the distal epiphysis appears during the second, third, or fourth week, and unites with the diaphysis during the tenth, eleventh, or twelfth month.

The ulna usually develops from three centers of ossification: one for the diaphysis which is ossified at birth, and one

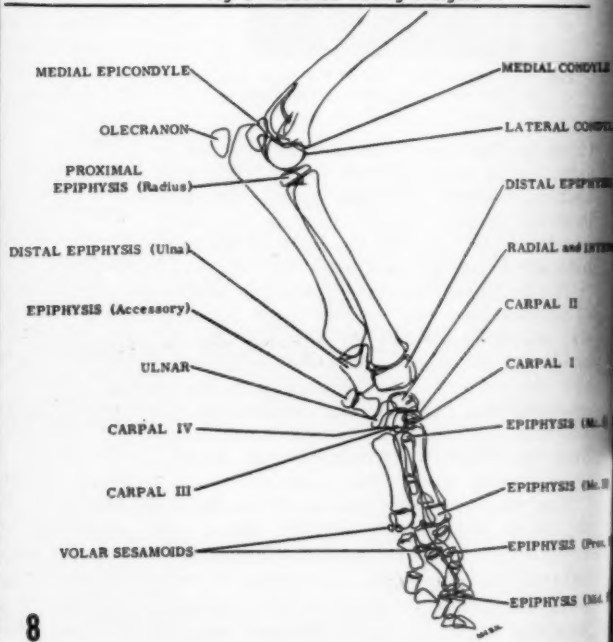
each for the olecranon and the distal epiphysis (fig. 7-10). But the distal epiphysis sometimes develops from two centers which fuse rapidly,[4] and occasionally it develops from four centers.[6] The center for the olecranon appears during the second month, and unites with the diaphysis during the eighth, ninth, or tenth month. The distal epiphysis also appears during the second month. At first, the center is ovoid, but as it develops, it becomes cone-shaped with the base hollowed out to receive the distal end of the diaphysis. Union with the diaphysis takes place during the tenth, eleventh, or twelfth month.

The carpus develops from ten centers of ossification. There is one center each for the ulnar, first, second, third, and fourth carpal bones. The accessory carpal bone develops from two centers, one for the body and one for the epiphysis. The radial carpal bone represents the fusion of the radial, intermediate, and central carpal bones, and develops from three centers, one for each of these bones. The center for the body of the accessory carpal bone is the first to appear, usually during the second week, and can be seen midway between the distal end of the radius and the proximal end of the fifth metacarpal bone. The remaining centers, with the exception of the center for the epiphysis of the accessory carpal bone, usually appear during the third to sixth weeks (fig. 1, 2). The center for the epiphysis of the accessory carpal bone appears during the sixth or seventh week, and unites with the body of the bone at almost 4½ months (fig. 9, 10).

Each metacarpal bone develops from two centers of ossification, one of which is for the diaphysis and is ossified at birth. The metacarpal bones of the second, third, fourth, and fifth digits have a distal epiphysis which appears during the fourth or fifth week and unites with the diaphysis

Fig. 7—Mediolateral view of the left forelimb of a 55-day-old Scotch Collie female.

Fig. 8—Labelled tracing of figure 7.



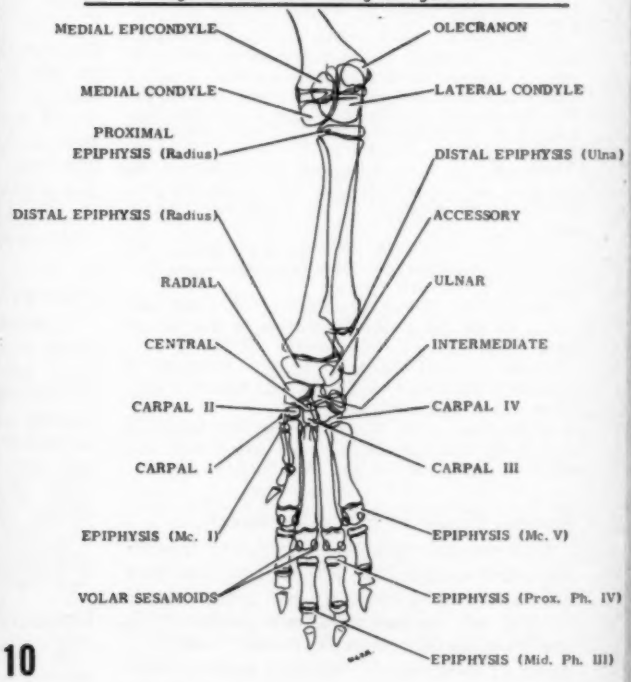
during the sixth or seventh month (fig. 1, 2, 7-10). The metacarpal bone of the first digit has a proximal epiphysis which appears during the fifth, sixth, or seventh week and unites with the diaphysis during the sixth or seventh month (fig. 7-10).

The proximal phalanx of each digit develops from two centers of ossification, one for the diaphysis which is ossified at birth and another for the proximal epiphysis. The center for the proximal epiphysis appears during the fourth or fifth week in the second, third, fourth, and fifth digits, but it may not appear until the sixth or seventh week in the first digit. It unites with the diaphysis during the sixth or seventh month (fig. 1, 2, 7-10).

The middle phalanx of the second, third, fourth, and fifth digits also develops from two centers of ossification, one for the diaphysis which is ossified at birth and another for the proximal epiphysis. The center for the proximal epiphysis appears during the fourth, fifth, sixth, or seventh week, and unites with the diaphysis during the sixth or seventh month (fig. 7-10).

Fig. 9—Dorsoventral view of the left forelimb of a 55-day-old Scotch Collie female.

Fig. 10—Labelled tracing of figure 9.



The distal phalanx of each digit develops from a single center of ossification which is ossified at birth.

The volar sesamoid bones appear during the third month (fig. 7-10). The phacoid bone and the dorsal sesamoid bones appear during the fourth month.

SUMMARY

On the basis of my observations and those of earlier workers, the times at which the centers of ossification appear and epiphyseal unions occur radiographically are outlined briefly, and the location of the centers is illustrated by roentgenograms and tracings.

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Ronnel (Dow ET 57) Approved

The organic phosphate systemic insecticide, first called Dow ET 57, has now been officially named (ronnel) and approved for control of several livestock pests. It is available as a spray, a smear, and as a bolus. The spray is effective against horn flies, lice, ticks, screwworms, and fleeceworms at dilutions of 0.75 per cent for cattle and 0.50 per cent for sheep, goats, and hogs. It should not be used on milking or sick animals.

To avoid residues in meat, it should not be applied to cattle within eight weeks of slaughter, hogs within six weeks, or sheep and goats within 12 weeks. The spray is particularly effective against screwworms, and will protect against reinfestation for seven to 14 days. The bolus can be used internally as a systemic insecticide for cattle grubs.—*U.S.D.A., May 20, 1959.*

Meat Type Hogs

About 25 years ago, 3.3 per cent of the American consumer's income went for pork and 2.3 per cent for beef. In 1957, only 2.0 per cent was spent for pork, while beef purchases rose to 2.7 per cent. Fifty years ago, the lean cuts of pork sold for no more than lard but now the price is 2.5 times greater.

In an investigation to improve the market for pork, it was found that, in Canada, where a government grading system has been in operation since 1922, about 70 per cent of the hogs would grade U.S. No. 1; 25 per cent would grade No. 2; with the No. 3 grade almost eliminated. In the United States, it is estimated that only 15 to 30 per cent of market hogs would grade No. 1. In Canada, the price differential for meat-type hogs over the lard-type, paid by packers, is nearly three times wider than has been thought possible in the United States.—*Agric. Marketing (Nov., 1958): 5.*

Allergy in Brucellosis

Animals with brucellosis acquire an allergy which is distinct from immunity. A dead, apathogenic antigen seems to be the sensitizing factor. The joints, tendons, tendon sheaths, and bursae are affected, granulomas develop, and there are characteristic changes of the genital organs. This phenomenon included inflammatory edema, cell infiltration, and necrosis.—*K. Wagener and B. Bisping in Berl. Münch. Tierärztl. Wchnschr. (July 1, 1959): 255.*

Mycosis from Antibiotic Lozenges

A number of patients have developed severe sore throats, due to *Candida albicans* infection, after using antibiotic lozenges. The soft palate and pharynx were extremely red and some showed small white patches. Pain was more severe than in inflammatory diseases including severe streptococcic infections. Some were fatal.—*J.Am.M.A. (March 14, 1959): 1235.*

The Effect of Nitrate or Nitrite when Placed in the Rumens of Pregnant Dairy Cattle

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NONINFECTIOUS ABORTION has been prevalent among cattle grazing on unimproved lowland pastures in central Wisconsin during the past 50 years. Studies begun in 1954 and reported in part[2-5] revealed that nitrates or nitrites, or both, present in many weed species were involved in the lowland abortion syndrome.

The quantity of nitrate or nitrite necessary to cause abortion has not been previously reported. Earlier studies in Wyoming[1] showed that the lethal dosage of potassium nitrate (KNO_3) for cattle is 25 Gm. per 100 lb. of body weight. Studies reporting the death of cattle from nitrate poisoning in South Dakota[6] and Missouri[2] suggest that abortion without impending clinical signs may be a feature of excessive nitrate intake.

The feeding trials reported here were conducted between November, 1956, and August, 1957, to determine the dosage of nitrate or nitrite necessary to cause abortion in cattle and to verify the hypothesis that nitrates present in herbage eaten by them were the cause of the noncontagious abortions which occurred on weedy lowland pastures.

EXPERIMENTAL METHODS AND RESULTS

Four trials using pregnant dairy heifers or cows were conducted.

Trial 1.—Five pregnant heifers were given 20 Gm. of KNO_3 by capsule twice daily for three weeks. None aborted or manifested clinical reactions attributable to the administration of KNO_3. Methemoglobin levels were not significant. One heifer calved normally two days later and was therefore not used in the subsequent study.

Trial 2.—Four of the heifers employed in trial 1 were started on another trial approximately three weeks later. Two were given 10 Gm. of sodium nitrite ($NaNO_2$) twice daily and 2 were given 40 Gm. of KNO_3 twice daily for three weeks.

At the end of one week, the blood of the 2 animals given $NaNO_2$ contained 12.0 and 4.4 per cent, respectively, of the hemoglobin as methemoglobin. At the end of the second week, the methemoglobin in 1 cow had risen from 12.0 to 18.0. She had a normal calf two weeks after the termination of the experiment. However, there were lesions of the fetal membrane comparable to those previously described[4] in natural cases of lowland abortions. The animals given KNO_3 showed no signs of illness and their blood contained no measurable methemoglobin.

TABLE 1—Doses of KNO_3, Weight, and Gestation Stage of Heifers in Trial 4

Group	Animal No.	KNO_3 (Gm./day*)	Weight (lb.)**	Stage gestation (months)
A	1	70	600	3
	2	70	600	3½
	3	70	700	3
B	4	100	600	6
	5	100	675	6
	6	100	650	4
C	7	140	700	6
	8	140	700	5
	9	140	700	6

*Unless otherwise noted in text; **based on estimates by a local cattle dealer.

Trial 3.—Four lactating, mature, pregnant cows weighing 1,300 to 1,400 lb. were fed marsh (bluegrass) hay, corn silage, and grain for ten days prior to and during the administration of $NaNO_2$. Two were given 20 Gm. and 2 were given 10 Gm. of $NaNO_2$ twice daily for three weeks. None showed signs of illness and samples of their blood contained no appreciable amount of methemoglobin.

From the Department of Veterinary Science (Kowalczyk) and the Department of Agronomy (Sund and Wright), University of Wisconsin, Madison; and the Cancer Research Laboratory, University of Florida, Gainesville, (Simon). Dr. Douglas is a practitioner in Stevens Point, Wis.

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TABLE 2—Methemoglobin and Nitrate Content of the Blood of Cows Which Died Following the Second Dose of 140 Gm. of KNO_3

Cow No.	Methemoglobin (%) of total blood	KNO_3 in blood (p.p.m.)
7	0.82	187.0
8	1.29	55.6
9	1.57	102.6

Trial 4.—The 9 pregnant heifers used were allotted to three groups of 3 animals each (table 1). Prior to and during the administration of KNO_3, they were kept in the barn and fed only bluegrass hay from the local marshes.

A plastic rumen fistula plug was installed in each heifer. The wounds were allowed to heal for 19 days prior to the administration of KNO_3.

The KNO_3 was given in dry form through a funnel inserted in the fistula plug at approximately 6:30 a.m. each day. Any material adhering to the funnel was washed into the rumen with water.

All 3 heifers of group C died approximately nine hours following the second administration of 140 Gm. of KNO_3. Necropsy revealed inflammation of the abomasum and small intestine in all 3 animals. The blood was dark purplish brown. The methemoglobin and nitrate content were determined 18 hours after death (table 2).

In group B, all 3 heifers given 100 Gm. of KNO_3 aborted. Heifer 5 aborted approximately eight hours after the third 100-Gm. dose of KNO_3 administered on Sunday, Monday, and Wednesday. Heifer 4 aborted after being given 100 Gm. of KNO_3 on Sunday, Monday, and Wednesday, and 90 Gm. on Friday. Rectal palpation revealed that the fetus in heifer 6 was dead 13 days after the initial treatment of 100 Gm. of KNO_3. Additional KNO_3 was administered for 23 days, but when abortion did not occur, stilbestrol was administered and the dead calf was aborted two days later.

The lesions in the fetal membranes of these 3 animals (group B) were identical with those found in animals which aborted on the lowland pastures.[4] The lesions of the fetuses were also similar to but not as extensive as those occurring in the fetuses aborted in the pastures. The perirenal hemorrhage was less marked and the pleura of the posterior lobes of the lungs was less thickened.

TABLE 3—Dosage Schedule of Heifers in Trial 4, Group B, and Methemoglobin Values (%) that Resulted

Date*	Heifer 4		Heifer 5		Heifer 6	
	Dose	Methemoglobin	Dose	Methemoglobin	Dose	Methemoglobin
7/12	0	0.08	0	0.12	0	0.04
7/14	100	.....	100	.....	100	.....
7/15	100	.....	100	.....	100	.....
7/17	100	7.72	100	5.53	100	0.39
7/18	0	2.00	0	0.12	90	0.39
7/19	90	8.62**	0	.....	100	2.51

*Blood samples taken at 11:30-11:45 a.m. on days given; **cyanotic—cyanosis first observed at 11:45 a.m. 250 ml. of 1 per cent methylene blue in 5 per cent glucose administered i.v. at 2 p.m.; at 4:30 p.m., appeared normal but aborted at 7:00 p.m.

The percentage of methemoglobin varied considerably among the heifers at the same dosage level (table 3) and at various time intervals during the day (table 4).

Analyses of methemoglobin in the blood of experimental animals were made once prior to treatment and several times after

TABLE 4—Percentage of Methemoglobin in Blood at Various Times on July 19

Heifer No.	Body weight (lb.)	KNO_3 (Gm. at 6:30 a.m.)	Methemoglobin (%) at: 8:30 a.m.	10:30 a.m.	11:45 a.m.	2:00 p.m.
1	600	70	0.35	1.14	0.24	0.43
2	600	70	0.31	2.51	1.69	0.71
3	700	70	0.74	0.74	0.55	0.27
4	600	90	0.86	6.23	8.62*	7.84
6	650	100	0.16	1.61	2.51	0.94

*Cyanotic—given methylene blue.

the administration of KNO_3 was begun. The blood of heifer 5 contained 5.53 per cent methemoglobin. Since her blood contained 12.49 per cent hemoglobin, 44.2 per cent (5.53 ÷ 12.49) had been converted to methemoglobin at the time of abortion (that afternoon). On the same day, 7.72 per cent of the blood of heifer 4 was methemoglobin. Her normal hemoglobin level was 11.75 per cent; therefore, 65.5 per cent had been converted to methemoglobin. However, she did not abort until two days later when the methemoglobin content of the blood was 8.62 per cent.

The blood of heifer 6 did not contain any appreciable amount of methemoglobin until the fifth day (table 3) following the first dose of 100 Gm. of KNO_3. On the succeeding days, her blood methemoglobin values were: 0.16, 3.72, 5.25, 2.74, 0.71, 6.98, 6.00, and 12.00 per cent. On July 28, with 12.0 per cent of the total blood as methemoglobin, methylene blue was administered since she was cyanotic. During the following 13 days, her methemoglobin values ranged from 7.06 to 9.43 per cent. All this time she retained a dead calf that was not aborted until she was given stilbestrol.

Heifers in group A (70-Gm. dosage) did not abort although 6.66 per cent of the total blood of heifer 2 became methemoglobin (table 5), a conversion of 54.5 per cent of her normal 12.2 per cent of hemoglobin. Furthermore, her calf at birth weighed less than 20 lb. Heifers 1 and 3 bore normal calves one and two months, respectively, after termination of KNO_3 dosing on August 30.

TABLE 5—Percentages of Methemoglobin in the Blood of Heifers in Trial 4, Group A

Date*	Hour samples taken	Methemoglobin (%) Heifer 1	Heifer 2**	Heifer 3
7/12	11:00 a.m.	0.12	0.04	0.04
			(First administration of 70 Gm. KNO_3 on 7/14)	
7/17	11:00	0.27	0.94	0.27
7/18	11:30	0.71	0.75	0.08
7/19	11:45	0.24	1.69	0.55
7/24	11:30	1.76	2.74	0.43
7/29	11:30	1.06	1.92	1.92
8/1	11:30	0.78	1.08	0.67
8/4	11:30	3.06	2.67	0.71
8/9	11:30	1.53	2.82	0.98
8/13	11:15	1.53	5.92	1.33
8/18	11:30	1.37	4.86	0.49
8/26	11:30	2.67	6.66	1.76
8/22	11:30	2.67	6.63	0.71
8/30	11:30	2.08	4.61	1.45

*Methemoglobin was determined daily but all daily readings are not included because the values were similar to those given; variations in methemoglobin values apparent within and among cows are unexplainable; **No. 2 had a small (20 lb.) calf.

DISCUSSION

The results of the first three trials indicated that larger dosages of nitrate or nitrite or longer periods of feeding these chemicals might be necessary to produce abortion. In trial 2, the animals given $NaNO_2$ (usually considered ten times as toxic as KNO_3) showed an appreciable development of methemoglobin and fetal membrane lesions when they later calved; those given KNO_3 showed no appreciable development of methemoglobin.

Trial 4 was, therefore, initiated using 70, 100, and 140 Gm. of KNO_3 in heifers weighing approximately 700 lb. each. The 3 given 140 Gm. on two consecutive days died, presumably of anoxemia, before abortion could occur. They appeared healthy at noon and were found dead at 4:30 p.m. The level of KNO_3 was presumed safe according to the lethal dosage indicated by Bradley, *et al.*[1]

Investigations conducted in Missouri[2] indicate that a ration high in carbohydrates will offset the poisoning effect of nitrate. The animals in trials 1, 2, and 3 were fed good rations while those in trial 4 were on a poor ration, being fed only marsh-grown bluegrass hay.

The administration of 100-Gm. doses of KNO_3 for varying periods resulted in abortion with fetal membrane lesions identical to and fetal lesions comparable to those in naturally occurring marshland abortions. The pathogenesis of the disease may include anoxia through methemoglobin formation with resultant vascular changes in the placenta, interference with exchange

between the dam and fetus, fetal death, and ultimate abortion.

The 3 heifers given the low level of KNO_3 (70 Gm., or 10 Gm. per 100 lb. body wt.) did not abort, although the blood of 1 of them contained a substantial amount of methemoglobin. The rectal examinations made during the extended feeding period indicated that the fetus of heifer 2 was dead; however, it was born alive but was small and inactive. At nine months of age, it was the size of a 3-month-old calf.

The data on methemoglobin (tables 3 and 5) are difficult to assess. The percentages of methemoglobin fluctuate from day to day in the same animal and among animals given the same amount of KNO_3. This fluctuation is evident even at two-hour intervals on the same day (table 4). It is possible that other compounds of hemoglobin may be formed with nitrate or nitrite and that the methemoglobin level may not be the most reliable measure of nitrate poisoning. Perhaps a measurement of nitrate or nitrite, or of both, in the blood of the dam would permit a more reliable forecast of impending abortion than can be made by measuring methemoglobin.

Time of sampling the blood for methemoglobin determination is important; the highest readings were obtained four or five hours after administration of KNO_3. Many variables are to be considered in methemoglobin determinations, such as the time the blood sample is taken following ingestion of test material, time elapsed from sampling to determination, nutritional level of the ration, rumen flora, method of assay, gestation status, type of nitrogenous material fed, and other factors.

The data presented as the results of trial 4 verify the hypothesis that nitrates present in the herbage eaten were the cause of the noninfectious abortions which occurred on weedy lowland pastures.

SUMMARY

No abortions were produced in the first three trials when small doses of KNO_3 or $NaNO_2$ were given to cattle. Lesions found on the fetal membranes, however, indicated that abortions might have occurred at higher dosages.

In the fourth trial, 9 dairy heifers were given KNO_3 daily through a rumen fistula. The 3 given 140 Gm. daily died after the second dose; the 3 given 100 Gm. daily aborted after three, five, and 13 doses, respectively, and the 3 given 70 Gm. daily for approximately 47 days calved at the normal time but 1 calf was small (20 lb.) and weak.

The variation in levels of methemoglobin found among animals within groups and in individual animals on different days was so great that it was considered to have little diagnostic value for detecting nitrate intoxication.

Lesions on the fetuses and fetal membranes of the 3 heifers which aborted were comparable to those observed in naturally occurring marshland abortions.

Nitrates present in weeds are involved in the marshland abortion syndrome, although their specific mode of action remains undetermined.

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Position of the Foal During Gestation and Parturition

Observations on normal pregnant mares were made by rectal palpation of the uterus at various stages of gestation, by slaughter of 77 normal mares during parturition, and from 27 cases of serious dystocia. All but one were monocornual pregnancies with the fetus in a longitudinal position.

During the first six months of gestation, the fetus was often in the position of posterior presentation but this was completely reversed by the eighth month in 98 per cent of the cases. The exact type of presentation could not be predicted by rectal palpation even during the last week of pregnancy.—*Vet. Bull. (May, 1959): Item 1613.*

Prevention of Noninfectious Abortion in Cattle by Weed Control and Fertilization Practices on Lowland Pastures

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A GRAZING TRIAL, more extensive than the one described in a previous paper,[3] was conducted during 1957 to evaluate: (*a*) the improvement of weedy lowland pastures by weed control and fertilization practices, and (*b*) the effects of these treatments on the prevalence of abortion in cattle grazing these areas. It is the purpose of this paper to discuss that phase of the grazing trial dealing with noninfectious abortion.*

MATERIALS AND METHODS

Eight experimental pastures were stocked with pregnant heifers on May 27, 1957 (table 1). These areas were established on a lowland pasture with a long-known history of abortions, and contained a large number of weeds. Early in 1957, areas 3, 4, 7, and 8 were weedy but areas 1, 2, and 6, which had been sprayed with 2, 4-D during 1956, were relatively free of weeds. Areas 2, 4, and 6 had been fertilized with 500 lb. per acre of 10-10-10 during the spring of 1956. Areas 2 and 4 were treated again with 720 lb. per acre of 6-24-24 plus minor elements (ME) during the spring of 1957. Area 7 was fertilized with the same amount of 6-24-24 ME during the spring of 1957.

Mineralized salt blocks were provided each group throughout the season. Water was provided in tanks for the cattle in areas 1, 2, 3, 4, 5, and 7; the cattle in areas 6 and 8 used the nearby drainage ditch for water.

Each of the 27 pregnant heifers was examined every Tuesday and Thursday to determine whether the fetus was dead or alive. The criteria used were intensity of uterine artery pulsation, tonus of the uterine wall, and fetal movement.

A blood sample was collected from each cow at approximately 11:00 a.m. every Tuesday and Thursday from May 27 to Sept. 17, 1957. Analyses of methemoglobin were made on the day after collection by the Wisconsin Alumni Research Foundation on all samples collected until July 9; thereafter the analyses were conducted one hour after collection in the local veterinarian's laboratory.**

Seven aborted fetuses and ten fetal membranes were examined for tissue changes. Ten fetuses were either too decomposed for examination or could not be found among the tall weeds of the pasture.

RESULTS

The 10 heifers in areas 1, 2, and 6 (weed-free areas) calved normally while all 17 heifers grazing the weedy areas (3, 4, 5, 7, and 8) aborted during the season. The 6 heifers grazing areas 3 and 4 (weedy in spite of spraying) all aborted, but these abortions occurred later than those in area 5 (untreated control area). The heifers in area 7 (fertilized but not sprayed) aborted relatively late in the season, while those in area 8 (untreated) aborted fairly early.

In all of the fetuses and membranes examined, tissue changes were similar to those observed during 1956.[3] The fetal membranes were usually eliminated soon after the abortion, but in 1 case, it was intact around the young aborted fetus. Most of the cows which aborted developed estrus in two to three weeks.

Signs of impending abortion (loss of intensity of artery pulsation, lack of tonus of uterine wall, and failure to detect fetal movement) were not detected in 8 of the 17 heifers which aborted; 4 of them showed no sign of disturbance within two days of the abortion. In 9 heifers, however, signs of impending abortion were apparent one,

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*Details and results of the agronomic phase will be published in the Agronomy Journal.

**The office of Dr. F. D. Douglas at Stevens Point, Wis.

five, five, 18, 18, 32, 37, 37, and 40 days, respectively, before the abortion occurred. Thus, as during 1956, it was apparent that this type of abortion could sometimes occur quickly, while in other instances a dead fetus could be carried several days before it was aborted and during this period the dam appeared to be normal.

The methemoglobin determinations, made on blood collected six to seven hours after the first major grazing period of the day, revealed marked variations among heifers regardless of the grazing area, but there was essentially no difference in percentage of methemoglobin in the heifers that aborted in contrast to those that calved normally. The methemoglobin ranged from 0.0 to 1.94 per cent of the total blood in the group which aborted, and from 0.0 to 2.01 per cent in the group that calved normally.

In several instances, the percentage of methemoglobin on the day an abortion occurred was lower in the aborting heifer than in those which did not abort. The samples of blood, however, may have been collected after the peak of methemoglobin development, which has been shown to be approximately four hours after ingestion of nitrate. Thus, the methemoglobin values obtained could not be correlated with the time of abortion nor could they be used to predict an impending abortion.

DISCUSSION

The weeds in areas 1, 2, and 6, having been reduced considerably with 2,4-D spray during 1956, were eliminated entirely by the first spraying of 2,4-D during 1957. Among 10 heifers grazing these areas, no abortions occurred. During 1956, the first year a spraying program was conducted, 1 of 8 heifers aborted while grazing on these areas.

A considerable number of weeds persisted in areas 3 and 4 during 1957, in spite of the spraying program begun that year, and all 6 heifers grazing these areas aborted. The spraying of areas 3 and 4 was delayed because of rains and wet ground, and the weeds were 8 to 12 inches tall when sprayed. It has been shown that plants sprayed with 2,4-D retain their nitrate and may even contain higher amounts shortly after spraying.[1,2,5] Thus, the 8- to 12-inch weeds sprayed with 2, 4-D in areas 3 and 4 apparently furnished enough nitrate to cause all the heifers to abort.

There seems to be a definite association between nitrate contained in weeds prevalent in lowland pastures and abortion in cattle grazing them. The elimination of the weeds prevented abortion in areas which had a known history of abortion; all 17 heifers grazing on similar but weedy areas aborted. The weeds were found to contain large amounts of nitrate; tissue changes in aborted fetuses and fetal membranes found on lowland pastures were duplicated by feeding KNO_3.[4]

The fluctuations in methemoglobin values obtained in the blood of animals grazing on treated and untreated areas are difficult to explain. From a diagnostic standpoint, these values contributed little to an understanding of the abortion syndrome. Numerous factors relating to methemoglobin production remain for elucidation. They include: type of herbage, factors affecting nitrate storage in plants, the role of rumen digestion, analytical procedures, time of blood sampling, and others. Perhaps nitrogenous compounds other than nitrite are formed in the rumen. Thus, in addition to anoxia, toxic products may play a role in causing abortion or other health disturbances in cattle.

It was demonstrated in this study that

TABLE I—Abortions Resulting in Cattle Grazing on Variously Treated Experimental Pasture Areas

Area	Treatments 1956 Fertilized	Treatments 1956 Sprayed	Treatments 1957 Fertilized	Treatments 1957 Sprayed	Weediness 1957**	No. of animals grazed 1957	No. which aborted 1957	No. which calved normally 1957
1	−	+	−	+	C	3	0	3
2	+	+	+	+	C	3	0	3
3	−	−	−	+	W	3	3	0
4	−	−	+	+	W	3	3	0
5	−	−	−	−	W	5	5	0
6	+	+	−	+	C	4	0	4
7*	−	−	+	−	W	3	3	0
8*	−	−	−	−	W	3	3	0

*Barn area; one pasture, 1956; divided into two, 1957; **C=clean; W=weedy.

death of the fetus and subsequent abortion, either immediate or delayed, was caused by some factor obtained in the weedy herbage. There is evidence that this factor is the nitrates or nitrites, or both, present in these plants.

Whether the fetus was killed by anoxia due to a lack of oxygen in the maternal blood, from a disturbance of nutrient exchange between maternal and fetal blood systems, or from the effects of nitrogenous compounds other than nitrate or nitrite remains to be determined. It might be speculated that nitrates or nitrites, or both, could be passed into the fetal blood system and thus develop a fatal amount of methemoglobin in the blood of the fetus, while relatively little methemoglobin is developed in the maternal blood.

SUMMARY AND CONCLUSIONS

Noninfectious abortions occurring on lowland pastures are associated with the prevalence of a large number of weed species. Eradication of the weeds prevented this type of abortion on lowland areas. All 10 heifers that were grazing on weed-free areas calved normally, whereas all 17 heifers grazing on weedy areas aborted.

Herbicidal treatment sometimes required two successive years of spraying to eradicate the weeds.

Fertilization of these areas greatly benefited the development and growth of bluegrass and other grasses for better production and better competition with weed growth.

The lack of tonus of the uterine wall and the loss of intensity of the artery pulsation may be useful in predicting an impending abortion. Methemoglobin determinations were not helpful in predicting an oncoming abortion. In this study, they varied widely and were not consistently associated with the grazing of variously treated areas.

The relationship of abortion to nitrate content of the weeds is discussed. Elucidation of the pathogenesis of this condition requires further investigation.

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Early Embryonic Mortality in Swine

From a study on early embryonic mortality in swine, at Iowa State College, all ova recovered from 8 bred gilts slaughtered one to two days after estrus showed cleavage. In 8 gilts slaughtered on pregnancy day 40, the average embryonic mortality was 38 per cent. Of gilts ovariectomized on day 15 after mating and slaughtered on day 25, pregnancy had not been maintained in 2 given 50 μg. of estradiol benzoate daily; pregnancy had been maintained in 6 of 7 gilts given 50 to 100 mg. of progesterone alone but the percentage of normal embryos to corpora lutea was low.

The best results were obtained with daily injections of 100 mg. of progesterone and 50 μg. of estradiol benzoate per 100 lb. of body weight. Of 17 gilts so treated, 13 maintained pregnancy with an average embryonic mortality of only 22 per cent, compared with 33 per cent in 15 intact gilts at the same stage of pregnancy.—*M. A. Emmerson et al. in J. Anim. Sci. (May, 1959): 607.*

Mycotic Abortion in Cattle

In a bacteriological study of 120 aborted bovine fetuses, 16 were apparently due to mycotic (*Aspergillus fumigatus*) abortion. —*G. Francalanci in Vet. Italiana (April, 1959): 291.*

Nipple vs. Bucket Feeding of Calves

In a four-month experiment with 24 heifer calves with identical diet and environment, the 12 fed with the nipple gained 104.75 kg.; the 12 fed from a bucket, 89.42 kg. The advantage was believed to be due to a better mixing of the milk with enzymes and a better coagulation of the milk when nursing.—*M. Belic and Z. Krstic in Veterinaria, 8, (1959): 113.*

Theory of Evaluating Bulls as to Breed ing Soundness

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SIGNIFICANT CHANGES are occurring in the cattle industry. American cattlemen are assigning a monetary value to every phase of the meat-producing business from sperm and ovum to beef on the table. Bull evaluation is one of these facets of progressive change. Veterinarians must qualify in the field of animal reproduction to accept this demand from the cattle industry. The major task is to provide a service at the professional level which cannot be surpassed.

Such a service demands that we standardize the criteria and the techniques for measuring these criteria. Progressive modification is always desirable, but variations in evaluation can only reflect unfavorably on the program and the profession. Realizing this hazard, practitioners and researchers throughout the United States have organized the "Society for the Study of Breeding Soundness in Bulls." The purpose of this organization is to formulate practical standards for measuring the breeding potential of bulls. This information is disseminated to all members. It is hoped that additional information will be acquired concerning the range beef bull and his most efficient use.

HISTORY OF THE COLORADO BULL EVALUATION SERVICE

The Colorado program for the evaluation of range beef bulls as to breeding soundness had its origin in the aftermath of disaster. Physical examination and evaluation of semen samples from bulls surviving the Colorado-Wyoming blizzard of 1949 failed to correlate the extent of scrotal frost-bite lesions with the quality of semen produced. The examinations did reveal that approximately 11 per cent of the bulls in the study did not meet minimal standards for range breeding bulls. It was observed that this percentage figure approximated the reported incidence of subfertile females.

The management of one ranch,* located in the area of the original investigation, utilized the facilities and personnel of the College of Veterinary Medicine at Colorado State University in evaluating its herd sires. Over a period of five years, representing normal environmental conditions, it was confirmed that the original estimate of 11 per cent undesirable bulls applied even in normal years. On the basis of this information, the owner enlisted the aid of the Colorado Cattlemen's Association to obtain a state legislative loan to provide the facilities for a wide-scale, practical program for evaluating range bulls on Colorado ranches. The program was instituted in the fall of 1954. This important veterinary service has been incorporated as a phase of clinical training for senior students in the College of Veterinary Medicine. Since its inception, this program has evaluated and classified more than 4,400 bulls, using a standardized system of measurements.

THE THEORY OF BULL EVALUATION

The net efficiency of a producing beef herd obviously depends, to a great degree, on the reproductive performance of individual animals. Selection of breeding stock on the basis of desirable conformation, carcass quality, high rate of gain and feed conversion, good mothering ability, and even color markings has been advocated in the industry for years. Cattlemen should also select for breeding potential, which is perhaps the most vital of all characteristics of a breeding bull.

It is true that the methods and techniques used to classify a bull's potential breeding efficiency are subject to some criticism. The practice of selecting desirable individuals on the basis of the aforementioned characteristics, however, is equally as vulnerable to criticism. Each is a measure of biological activity and subject to a certain amount of error. Still, we cannot deny the improvement in quality of

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cattle from the Longhorn to the modern beef animal.

The physical examination includes an analysis of currently detectable abnormalities of sight, motion, reproductive soundness, and general condition as they might affect the bull's ability to produce conception during the breeding season to come. Physical examination is obviously less variable in its correlation to breeding efficiency than is the evaluation of semen quality. Certain physical defects preclude even the act of coitus.

Evaluation of a single semen sample from a given bull is not sufficient to enable the veterinarian to guarantee that bull to be absolutely capable or incapable of producing conception in healthy females. It is possible in most instances, though, to conclude from careful examination of several samples that a given bull is less capable than other bulls of achieving the desired results. The range of semen quality which is potentially satisfactory for fertilization under natural breeding conditions is wide, while that which is below the minimum standards for satisfactory conception is relatively narrow.

The commercial beef breeding season in the western United States extends over a period of 90 to 150 days. It is modified in areas according to climatic conditions, management factors, types of market, etc. It is safe to say, from what is currently known about testicular function, that a bull producing semen of inferior quality at the time of examination should not be assigned to the herd for the current breeding season. The inferior classification might change at a subsequent evaluation four to six months later, but the influence on the efficiency of the breeding herd during the current season is still apparent. Of 4,420 bulls evaluated in the Colorado program between July 1, 1954, and July 1, 1598, 13 per cent were classified as being potentially uneconomical herd sires (table 1).

Herd history is an important factor in determining breeding efficiency. Reproductive performance by the bull is modified by possible infection in the herd. Inbreeding may have an adverse effect on reproductive performance. Percentages of heifers, cows, and aged cows in the breeding herd may explain a poor record of performance on the part of the bull. Low calf crops in previous years might indicate a management factor. Critical interpretation of all data establishes the final classification—"Satisfactory," "Questionable," or "Unsatisfactory."

TABLE 1—Results of Colorado Bull Testing for a Four-Year Period

Year	No. of bulls	Satisfactory (%)	Questionable (%)	Unsatisfactory (%)	Potentially poor breeders (%)
1954-55	902	87	6	7	13
1955-56	950	88	8	4	12
1956-57	908	87	7	6	13
1957-58	1,660	85	6	9	15
Totals	4,420	87	7	6	13

First, a description of each criterion of semen quality is translated into a numerical score. The cumulative score of several of these criteria is then computed. This semen quality score is tempered by physical findings and anamnesis, and the bull is assigned a final classification.

The "Satisfactory" bull is physically sound and has semen quality which compares favorably with that of bulls known to produce satisfactory conception rates.

The "Questionable" bull is lacking in some physical attribute, has inferior semen quality, or both. It is impossible to predict the breeding efficiency at the time of examination, but measurable criteria are less than desirable.

The "Unsatisfactory" bull has qualifications which are so far below normal standards that it is an uneconomical gamble. Unless the cause is an easily corrected physical handicap, mature bulls so classified seldom improve and are best removed from the breeding herd.

The strikingly uniform distribution of bulls in each category, as recorded by the Colorado Bull Evaluation Service over the past four years, is evidence that such a method of classification is repeatable and can minimize the variations which inevitably occur when several investigators attempt subjectively to score such a biological process (table 1). The bulls in this study were evaluated by four different veterinarians.

CONCLUSION

Few single achievements could benefit our profession as much as a program that would prove to the men of the cattle industry that they are getting an accurate, careful, uniform appraisal of the breeding bull. Few things could reduce the position of our profession more completely in the minds of these same men than the failure of such a program.

Castration of Cryptorchid Bulls

Cryptorchidism, which is rather common in working bulls in India, creates a problem since the animals have male instincts, are not docile for working and, therefore, are useless. Two cases are reported where the descended testicle had been removed a year previously. The retained testicle in each was palpated *per rectum*. One was behind the left kidney, the other on the right side at the pelvic brim near the sacrum. Both were removed through 4-inch incisions high in the flank, but since they could not be drawn through the incision, an emasculator was introduced and operated with one hand while the other inserted hand controlled the testicle. The emasculator was kept on the severed cord for about five minutes to prevent bleeding.—*B. N. Patra in Vet. Rec. (April 18, 1959): 321.*

[Bovine cryptorchidism seems to be rare in America, but testicles not infrequently are found in the subcutaneous area anterior to the scrotum. They are not difficult to remove if the animal is cast and an incision made through the skin over the testicle. The chief difficulty is in penetrating the areolar subcutaneous tissue in order to grasp the elusive organ, since it has relatively unlimited movement in the area.—W.A.A.]

Embryo Mortality in Dairy Cows

Pairs of heifers were bred to bulls of high fertility at Cornell University, then 1 of each pair was slaughtered at three days, the other at 33 days, after breeding. Almost all (96.6%) of the normal, healthy heifers which were bred at the proper time contained fertilized ova at three days, but only 86.1 per cent contained live embryos at 33 days.

Observations made in randomly selected slaughtered cows indicate that improperly functioning corpora lutea may be responsible for the failure of some embryos to survive. In a large number of nonpregnant cows, 12 per cent had large central cysts in corpora lutea wheras no such cysts were found in any of the pregnant cows. Thus, injections of progesterone in "repeat breeder" cows might reduce embryo mortality.—*A.I. Digest (March, 1959): 6.*

Tetanus Spores in Bandages

In an investigation with 666 samples of various types of wound dressing materials, tetanus bacilli were isolated from 23, all but three of which were unbleached cotton-wool or cotton-wool bandages. Contaminated gloves may be of greater danger. To avoid bringing spores into the surgical area, all dressings should be sterilized previously—not in the area.—*Brit. Med. J. (May 2, 1959): 1150.*

Sexual Activity in Mules

Study of the semen in testicles of 2 male mules, 30 to 36 months old, revealed a condition resembling that of hypogonadism. A third mule showed slightly improved activity after four months' treatment with gonadotrophic hormone. Three female mules of the same age, studied throughout a summer, showed sexual abnormalities of various degrees.

The authors suggest that hormone treatment of male mules and selection of females with the least genital abnormalities might result in success in the breeding of mules.—*Vet. Bull. (June, 1959): Item 1950.*

Studies of Vibriosis in Cattle

Vibrio fetus infection of cows occurred when cultures were added to the semen before insemination. The only clinical sign of infection was a slight change in quality and quantity of mucus. The induced infection was successfully treated by intrauterine irrigation with streptomycin up to 96 hours after the service; intravaginal therapy with pessaries containing streptomycin and penicillin had no effect.—*Vet. Bull. (May, 1959): Item 1349.*

Edema Disease in Swine

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AS THE RESULT of a serious outbreak causing the deaths of over 30 pigs in a group of 93,[5] edema disease has been a personal hobby for almost six years. The manner in which the disease suddenly occurs, generally without premonition in healthy and well-doing pigs, provides most interesting and and intriguing situations. Since the disease most frequently attacks pigs 6 to 12 weeks old, it commonly follows vaccination for hog cholera, and thus can create a serious strain on veterinarian-client relationships. Recently, when the disease developed one week after vaccination, the client, although not associating it with vaccination reactions, accused the veterinarian of "carrying it on the place."

For many years the cause of edema disease has been obscure. Although its development in numerous herds in a community within a short time strongly suggested contagion, transmission experiments failed to validate such a conclusion. Stress conditions such as weaning, vaccinating, changing quarters, and changing feed have often appeared to trigger its development.[10]

The first breakthrough in the search for the cause was provided in 1950 by Timoney[15] in Ireland when he reproduced the disease by injecting, intravenously, supernatant fluids of intestinal contents of pigs that had died of edema disease. This indicated that the disease might be an intestinal toxemia, perhaps similar in character to enterotoxemia of sheep.

In the search for likely causative microorganisms in the intestinal tracts of affected swine, it was found by several independent investigators[6-8,11,12,14,16,17] that hemolytic *Escherichia coli* always were present in great numbers. Subsequently, typical signs and lesions have been produced by injecting extracts of hemolytic *Esch. coli* into experimental pigs.[3,6-8,16,17]

Fig. 1—Experimental pigs showing clinical signs of edema disease.

Although at least eight different serological types[4] have been incriminated in edema disease, two serotypes appear to be associated with the majority of cases.

This situation appears to be somewhat analogous to the paratyphoid infections. Like the paratyphoids, *Esch. coli* is a large group of bacteria, probably comprising several hundred distinct serological types. Most of the types so far identified are

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innocuous organisms that are never involved in disease processes. Others are highly pathogenic and have been definitely established as causative agents in cystitis in man and in human infant and calf diarrheas. An interesting feature of the diarrheal pathogens in man is that the bacterial cells appear to be encased in an enveloping substance known as "B" antigen. Similar "B" antigens, although of somewhat different antigenic compositions, are also present in the two common serotypes associated with edema disease.

A recent study[16] of the edema disease toxic factor present in bowel extracts indicates it to be of the nature of a true or exotoxin. It is readily destroyed by heating above 65 C. and is antigenic. The toxic product is quite stable when maintained at low temperatures. I have kept bowel extracts in the freezing compartment of a refrigerator for over two years without apparent loss of potency.

Potent bowel extract and antihemolytic *Esch. coli* serums have been prepared which are effective in preventing experimental edema disease.[16,17] When the serums are mixed with potent bowel extracts prior to intravenous inoculation, the toxic edema disease-producing factor is satisfactorily neutralized. When the serums are given by other than intravenous routes, adequate neutralization of the toxic factor requires an increase in the amount of serum, and it must be given for a considerable time preceding the bowel extract.[9] It is likely that the toxic factor, when present in the blood stream, unites quickly with the susceptible cells.

Experimental Edema Disease

Following intravenous inoculation of materials causing edema disease, pigs generally show some intoxication (unrelated to edema disease) of variable severity and duration. After such periods of depression, pigs generally appear normal. Depending on several factors, among them size of dose and pig weight, signs of edema disease first occur from several hours to as long as 72 hours postinjection and generally progress rapidly in intensity. Frequently there is marked swelling of the eyelids. Other early signs are depression, walking slowly backward, exaggerated lifting of the feet in walking, trembling, dyspnea, slow circling movements, and slowly developing rigid tonic spasms. Before death, the pigs generally lie on their sides (fig. 1) and actively move the legs in paddling fashion. The internal lesions are identical to those seen in natural cases.

In the past year, I have been able to produce a syndrome in mice, by means of intravenous and intraperitoneal injections of bowel extract, which is comparable with edema disease in pigs.[9] Mice develop nervous signs such as depression, trembling, tonic and clonic spasms, and unusual body movements. In addition, unless death takes place within 24 hours, marked pleural effusion with resulting dyspnea occurs. If mice survive for four or five days after inoculation, marked subcutaneous edema may occur.

Treatment

Therapeutic measures employed in the past have for the most part been empirical, and have not resulted from sound experimental observation. There may be tremendous differences in morbidity and mortality, and unless field observations are well controlled, evaluation of any drug, serum, or form of treatment is likely to be erroneous.

Favorite treatments are purging with epsom salts, changing the rations, using detoxifying agents, and injecting thiamin and multivitamin preparations. The use of purgatives is logical in that there is an attempt to rapidly expell noxious material from the digestive tract. On the other hand, there is no factual evidence that any good is actually accomplished. Since the disease often follows ration changes, some believe that additional changes in quality or quantity are beneficial. The use of thiamin injections has been popular in the immediate past in the belief that edema disease is actually a thiamin or multiple B vitamin deficiency. Actually, it has been soundly demonstrated that thiamin plays no part in edema disease.[13]

In the belief that edema disease is a *Clostridium perfringens* toxemia there has been some interest in the use of *Cl. perfringens* antitoxins. It has been my experience that *Cl. perfringens* types B, C, and D antitoxins are without value in preventing signs of edema disease in mice inoculated with potent bowel extract materials.

Some sulfonamides (sulfathiazole sodium and sulfamethazine sodium) and antibiotics (neomycin, chloramphenicol, and dyhydrostreptomycin) inhibit the growth of

hemolytic *Esch. coli* associated with edema disease.[8] Nitrofurazone has a similar effect. For this reason, in treating animals with field cases of edema disease, I usually medicate the drinking water with one of these drugs. For economic reasons, I usually use sulfathiazole sodium in the drinking water at the rate of 1 lb. per 100 gal. of drinking water for four to five days. Sulfamethazine-sulfamerazine solutions have been recommended for parenteral administration.[1]

Recently, limited evidence of corticosteroids being of value in treatment of edema disease has been presented.[2] My own observations indicate that prednisone is of no value when given to mice injected with bowel extract. In experimental pigs inoculated with potent bowel extracts, the results of prednisone injections have been inconclusive. Further study of such drugs is warranted. In one field case in which the clinical signs were identical with those of edema disease, but in which necropsies were not performed, 6 pigs were given 1-ml. intramuscular injections of prednisone and all recovered.

Since it has been shown that the toxic edema disease-producing factor present in the intestinal contents of pigs that have died of edema disease is neutralized by certain antihemolytic *Esch. coli* serums, such serums should be quite effective prophylactic agents in herds where the disease is occurring. Unfortunately, such antiserums are not commercially available.

SUMMARY

Edema disease most frequently attacks pigs 6 to 12 weeks old, and thus is sometimes observed subsequent to hog cholera vaccination. Although stress conditions often appear to trigger its appearance, the disease has been demonstrated to be an intestinal toxemia, apparently of hemolytic *Escherichia coli* origin. Typical signs and lesions of the disease have been produced following parenteral administration of extracts of certain hemolytic *Esch. coli* serotypes, and antiserums of such organisms have been proved experimentally to be effective in neutralizing the edema disease toxic factors which are present in the intestinal tracts of edema disease carcasses. The disease has been reproduced in mice.

As certain sulfonamides, antibiotics, and nitrofurazone inhibit the growth of hemolytic *Esch. coli in vitro*, it is suggested that such materials be used in drinking water for affected herds. Although evidence of benefit from the use of corticosteroids is at present inconclusive, such drugs should be used in individual cases until shown to be valueless.

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No Advantage in Spaying Gilts

The growth and carcass quality of 78 spayed gilts was below that of intact gilts. There were cytological changes in the pituitary glands of the spayed gilts.—*Vet. Bull. (May, 1959): Item 1624.*

Listeriosis in Baby Pigs—A Case Report

MAURICE W. HALE, V.M.D.

Tifton, Georgia

THIS REPORT describes an outbreak of listeriosis involving several litters of baby pigs in southern Georgia. At least 5 cases of this disease in swine in the United States have been reported but these are principally from the north central states.

According to the records, only 2 cases of listeriosis have been diagnosed previously in swine in this laboratory. In one, involving suckling baby pigs, seven litters were affected and deaths occurred in each litter. It was described as a wasting disease in which diarrhea was not a characteristic sign. Gross lesions included necrotic foci in the lungs and infarcts of the spleen. Listeria organisms were isolated in broth mediums from the kidney and spleen. These pigs were also affected with parakeratosis. The other recorded case involved 2 shoats, each weighing 150 lb.

The incident reported here, while rare, indicates that probably listeriosis should be included in the list of baby pig diseases.

CASE REPORT

The drove included 21 brood sows which were in poor physical condition. The pigs from the 2 sows which farrowed prior to April 15, 1959, were unusually small at birth and the death of 50 per cent of them was attributed to malnutrition of the sows.

On April 15, a sow farrowed 8 healthy pigs. They were given 2 ml. of an iron solution subcutaneously and the canine teeth were clipped. Three days later, the farmer reported that 3 of these pigs were dead and the others had a severe diarrhea. The living pigs were unable to rise and when set on their feet were stiff. Each was given 6 ml. of hog cholera serum and a mixture containing approximately 600,000 units of penicillin and 1 Gm. of streptomycin, subcutaneously. The next day 1 of these pigs died but the other 4 recovered.

On May 15, another sow farrowed 10 pigs. Each was given iron solution subcutaneously and the canine teeth were clipped. When 3 days old, these pigs were well filled out and seemed to be doing well. However, the next day the farmer reported that 4 were dead and the rest seemed to be sick. The sick pigs were treated similarly to those in the previous litter and recovered. Two of the dead pigs were packed in ice and forwarded to the laboratory to be examined for transmissible gastroenteritis.

On May 19, two litters of 7 pigs each were farrowed with 1 weak pig in each litter. On May 20, a litter of 10 pigs was farrowed. All pigs in the three litters were given antibiotics and iron and all survived except the 2 weaklings.

At present, the sows are being given 65 mg. of methenamine twice daily in their drinking water and each is given 1 Gm. of oxytetracycline hydrochloride subcutaneously at parturition. All pigs are given penicillin-streptomycin soon after birth. No new cases have developed.

LABORATORY FINDINGS

Necropsy of the 2 baby pigs received on May 20, 1959, revealed slight anemia and mild icterus. Gross lesions were limited to moderate congestion of the lungs and severe hemorrhage of the small intestines with free blood in the lumen. Sections of the intestines with contents were frozen for viral studies. Sections of the liver, lungs, kidneys, and spleen were fixed in 10 per cent formalin for microscopic examination. Bacteriological cultures of the liver, kidneys, and lungs were made in heart infusion broth. Pure cultures of *Listeria monocytogenes* were isolated from all organs cultured.

The organism was identified by its staining, morphological, biochemical, and cultural characteristics. It is a small gram-positive rod with rounded ends and occurs singly or in parallel pairs with some short chains of 3 or 4 organisms. Colonies on ox blood agar are small, smooth, circular, transparent, producing a clear zone of hemolysis. In heart infusion broth, there is light turbidity with a slightly granular sediment. The organism is motile.

After 24 hours at 37 C., acid with no gas was produced in dextrose, rhamnose, and salicin. Maltose, dextrin, and lactose showed slight acid for-

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The author thanks Drs. S. G. Frazier and E. M. Ellis, and Mr. Hugh Godwin for their assistance.

mation while glycerol, sorbital, xylose, dulcitol, inulin, inositol, and arabinose remained unchanged. No hydrogen sulfide was formed in triple sugar iron medium, gelatin was not liquefied, and nitrates were not reduced. Litmus milk was decolorized.

Six mice were injected intraperitoneally with 0.2 ml. of a 24-hour broth culture. Five died within 48 hours and the organism was recovered from necrotic areas in all of their livers. Antibiotic-sensitivity tests of the organisms showed that streptomycin, magnamycin, neomycin, bacitracin, and furacin inhibited growth while penicillin, terramycin, tetracycline, aureomycin, erythromycin, chloromycetin, triple sulfa, and polymyxin B did not inhibit growth.

Histological sections of the livers showed numerous small necrotic foci containing large numbers of the organisms. Organisms were also seen in sections of the lungs, spleen, and in the medulla of the kidney. The histological structure of these organs was not markedly altered.

The brains were not removed from the baby pigs at the time of necropsy. The chief reasons for this unfortunate omission were the absence of signs of central nervous system impairment and the tentative field diagnosis of transmissible gastroenteritis. Fortunately, the disease was present in a septicemic form and a diagnosis could be provided promptly. It is believed that the results of the antibiotic-sensitivity tests on the offending organism will be of value in the treatment of future cases of this disease.

SUMMARY

Listeria monocytogenes was isolated from several organs of 2 baby pigs which died with clinical signs typical of many pigs that died in seven litters in one herd. The most characteristic clinical signs were diarrhea, weakness, and stiffness.

The affected pigs seemed to respond to specific antibiotic therapy.

Listeriosis in Pigs

Two weeks after 47 pigs were weaned and vaccinated with a lapinized hog cholera vaccine, on a cooperative farm in Yugoslavia, many of them became ill and few recovered. They developed an uncontrolled and rigid gait, spasms of the individual parts of the body, loss of voice and sight, and paralysis.

Except at the very beginning of the disease, the body temperature was normal or subnormal. Some pigs had diarrhea and vomited. Illness lasted from two hours to five days. Several of the 7-month-old hogs on the farm also were affected and died.

Nine necropsies were typical of the nervous form of listeriosis, as described in the literature, and *Listerella monocytogenes* was isolated from all the tissues cultured.—*B. Kalikin in Veterinaria, 7, (1958): 557.*

The Tonsil and Swine Erysipelas

Many swine have been found to harbor the erysipelas bacillus in the tonsil without developing the disease. It is assumed that the lymphocytes in the areas designated as germ centers in the tonsil can form antibodies and often are, therefore, active defense agencies. During stress periods this defense activity may be hampered so that the erysipelas organism is able to enter the system through the tonsil and create a septicemia. In swine which died of erysipelas, these germ centers were usually necrotic.—*W. Mundt in Die Vet.-med. (Jan., 1959): 47.*

Erysipelas Antibodies in Colostrum

The erysipelas antibody titer is much higher in the colostrum of a sow than in her blood, the level depending on her degree of immunity. Thus the duration of immunity acquired by the newborn pig through colostrum depends upon the degree of the immunity of the sow. It may last only a few weeks or several weeks.—*G. Wellmann and F. Heuner in Die Vet.-med. (Jan., 1959): 46.*

Experimental Infection of Pigs with *Trichomonas fetus*

When 22 pigs, 9 to 52 days old, were inoculated two to four times with cultures of *Trichomonas fetus* or with fresh material containing trichomonads obtained from infected pigs, infection was found in the noses of 14, in the stomachs of 3, and in the ceca of 20 when they were killed 15 to 29 days after the last inoculation. Trichomonads were not found in any of the uninoculated control pigs.—*Vet. Bull. (June, 1959): Item 1740.*

Tetralogy of Fallot in the Dog

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TETRALOGY OF FALLOT is the most common congenital heart disease causing cyanosis in man. Though there are scattered reports of congenital heart disease in dogs, clinical-pathological reports of this lesion complex are rare. The purpose of this paper is to review the clinical, physiological, and pathological changes resulting from this complex of lesions and to report a case of tetralogy of Fallot in a 4-month-old male Beagle in which the clinical diagnosis was made and confirmed by necropsy.

Tetralogy of Fallot consists of a complex of four lesions of the heart and was described in 1888.[1] The lesions are: (1) ventricular septal defect, (2) pulmonic stenosis, either valvular or infundibular, (3) overriding of the origin of the aorta over the right ventricle, and (4) right ventricular hypertrophy. The primary lesions consist of a ventricular septal defect and pulmonary stenosis. The right ventricular hypertrophy is a result of these two lesions and is not congenital. The overriding of the aorta is probably a result of the high position of the ventricular septal defect. The membranous portion of the ventricular septum is normally the only structure preventing the aorta from overriding the right ventricle. The septal defect in tetralogy of Fallot is in the membranous portion.

Fig. 1—Heart of a 4-month-old Beagle with tetralogy of Fallot; the right ventricle has been opened. The white area on the left is the ventricular septal defect. The horizontal arrow points to the origin of the aorta from the right ventricle. The small (vertical) arrow points to the infundibular pulmonic stenosis. Behind this arrow is the pulmonic valve. The thickened wall of the right ventricle is also shown at the cut edge to the right.

PATHOLOGICAL PHYSIOLOGY

The normal circulation of blood in the dog is through the cavae, right atrium, right ventricle, lungs, left atrium, left ventricle, and to the body to return to the cavae. In cases of tetralogy of Fallot, the blood goes from the right atrium to the right ventricle and there divides between the aorta and the pulmonary artery. This is a result of impedance to flow through the stenosed pulmonary artery, and the presence of the ventricular septal defect.

Blood going into the aorta from the right ventricle results in the low oxygen tensions of the blood in the peripheral circulation. Blood returning to the left ventricle leaves almost entirely by way of the aorta, because this vessel is located in alignment with the stream through the ventricular septal defect. A portion of the blood from the left ventricle, however, passes through the ventricular septal defect into the right ventricle and then into the pulmonary artery. The oxygenated blood returning from the lungs occupies some of the already limited space in the stenotic pulmonary outflow tract.

The clinical signs resulting from this lesion are due to the abnormal circulation. The most obvious one is cyanosis, usually present from birth and almost always pronounced. There is failure or retardation of growth and reduced exercise tolerance.

Auscultation will reveal a loud systolic murmur over the ventral portion of the

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thorax which is more pronounced on the right. There is cyanosis and polycythemia.

CASE REPORT

A 4-month-old Beagle was examined at our laboratory because of a history of reduced exercise tolerance which was manifested by collapsing in the prone position and by hyperpnea.*

Physical Examination.—Physical examination revealed the pup to be small for his age, but apparently well nourished. He was about half the size of his 3 litter mates. The mucous membranes were cyanotic. There was a loud systolic murmur over the ventral aspect of the thorax, loudest on the right side.

Laboratory Data.—Hemoglobin was determined by the spectrophotometric method of Hickman and Frazier[2] and was 24 Gm. per 100 ml. Arterial oxygen saturation was determined by the method of Hickman and Frazier[2] and found to be 86 per cent.

Cardiac Catheterization.—The animal was given a general anesthetic with intravenous sodium pentobarbital. The right external jugular vein was exposed by a transverse incision in the midportion of the neck. The vein was opened distal to a ligature and a woven catheter was introduced through this opening. By means of fluoroscopic monitoring, the tip of the catheter was advanced through the anterior vena cava, right atrium, and right ventricle. Entrance into the pulmonary artery was not possible. Pressure was determined in the right atrium and right ventricle with a resistance bridge transducer.

Blood samples were taken from the right atrium and right ventricle for oxygen saturation determination. Technical difficulties made it impossible to obtain exact values. Visual examination of the samples of blood from the right atrium and right ventricle indicated the blood from the right ventricle was more oxygenated than that from the atrium. The right ventricular pressure was 83 over 3 mm. Hg. We have found in our laboratory that the normal right ventricular pressure is from 10 to 20 over 0 to 3 mm. Hg.

Roentgenograms.—The pulmonary vascularity was strikingly less than normal. The heart size was normal. No chamber enlargement was discernible.

During anesthesia, the dog vomited and died, probably of aspiration, although no vomitus was found at necropsy (the tracheobronchial tree was well aspirated immediately after the vomiting). At necropsy, the lesion complex of tetralogy of Fallot was found (fig. 1).

DISCUSSION

Tetralogy of Fallot is not a frequent congenital anomaly in the dog; however, it is important that it be diagnosed so that an accurate prognosis can be given, and proper therapy initiated. The disorder may be diagnosed on the basis of a history of retarded growth and reduced exercise tolerance; systolic murmur over the ventral aspect of the thorax, which is usually more pronounced on the right side; cyanosis; and on the basis of laboratory data.

Laboratory studies will reveal elevated hemoglobin and low arterial oxygen saturation. Cardiac catheterization will reveal high blood pressure in the right ventricle and low blood pressure in the pulmonary artery. There is consistent difficulty in inserting the catheter into the outflow tract of the right ventricle due to pulmonary stenosis. The oxygen content of right ventricular blood samples will be greater than that of the atrial samples.

Roentgenological examination will reveal a less than normal pulmonary vascularity. This is a consistent finding in human cases and should prove to be a valuable diagnostic aid. The size of the heart shadow is usually normal, but the contour is abnormal in that there is a small pulmonary artery and large aortic arch.

SUMMARY

The diagnosis of tetralogy of Fallot in a 4-month-old pup was made and confirmed at necropsy. Physical examination revealed that the pup was small for his age. The mucous membranes were cyanotic, and there was a loud systolic murmur over the ventral aspect of the thorax. The owner reported that the animal collapsed after small amounts of exercise.

Cardiac catheterization indicated the presence of pulmonic stenosis, and it was found that the right ventricular pressure was high. Roentgenological examination re-

*Gratitude is expressed to Martin Lorber, D.V.M., Boulevard Animal Hospital, Winston-Salem, N. Car., for referring this dog to us for study.

vealed that the pulmonary vascularity was less than normal.

At necropsy, the heart was found to contain a ventricular septal defect, pulmonic stenosis, and right ventricular hypertrophy. The origin of the aorta overrode the right ventricle.

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The Cyanotic (Syncopal) Attack in Fallot's Tetralogy

Human patients with Fallot's tetralogy are prone to attacks of increased cyanosis, with associated loss of consciousness. These patients may recover spontaneously from the attacks, but fatalities are known to occur. A history of syncopal attacks indicates the need for corrective surgery.

A patient with "acyanotic Fallot's tetralogy" developed a cyanotic (syncopal) attack during cardiac catheterization. The attack was probably precipitated by the prolonged presence of the catheter in the pulmonary outflow tract. The condition was studied hemodynamically, and it was believed that the attack was due to increased resistance to the flow of blood through the narrowed infundibulum. The treatment of the patient was difficult, and procaine intravenously was found to be effective, although the effect was not sustained. Morphine proved effective in relieving the attack.—*J. L. Braudo, M.D. and M. M. Zion, M.D. in Brit. Med. J. (May, 1959): 1323, 1325.*

Pasteurellosis in Rabbits

Pasteurellosis in rabbits, characterized by sudden death, was controlled by treatment of the exposed animals with dihydrostreptomycin (100 mg./kg. body wt.), injected daily for three days, and by disinfection of the hutches.

In another instance, both acute and chronic cases were controlled by feeding oxytetracycline (0.4% of the ration for 7 days), disinfection, and isolation of rabbits with chronic cases.—*Vet. Bull. (May, 1959): Item 1304.*

Toxascaris leonina in a Cat

SANFORD M. SCHOR, D.V.M.

East Orange, New Jersey

A 1-year-old male cat had severe dyspnea upon his return home from an all-night foray. The body temperature was 102 F., and he appeared otherwise normal. A foreign body obstruction of the pharynx or trachea, or both, was suspected but the cat was fractious even after he had been given a sedative injection, and his mouth could not be opened for examination. It was decided to administer a high colonic saline solution enema. As a result, the cat vomited 28 small roundworms (*Toxascaris leonina*), and breathing thereafter was normal.

It is not unusual for animals with ascariasis to regurgitate worms, but I have never before known them to cause such a sudden severe dyspnea.

Dr. Schor is a small animal practitioner in East Orange, N.J.

Transmitters of Brucellosis

Mosquitoes, *Culex pipiens*, were found to carry viable Brucella organisms on their bodies for up to 36 hours, in the digestive tracts up to 72 hours, and in their feces up to 48 hours after ingestion of infected blood. Brucella were not found in 400 mosquitos trapped in a barn with an infected herd but where no abortions were occurring.

• • •

Cats were found to carry brucellosis when fed virulent 48-hour culture of the organisms suspended in milk. All of the 10 cats showed an increase in agglutination titer. They also excreted viable Brucella in their feces for three to six days, but never after 15 days. Of 5 guinea pigs kept with 5 infected cats, 3 developed agglutination titers.—*Vet. Bull. (June, 1959): Items 1697 and 1698.*

Salmonella in Feed and Fertilizers

Of 1,262 samples of organic fertilizers and animal feed stuffs examined, many contained Salmonella organisms; 88 serotypes were isolated.

Anthrax bacilli were found in 5 of 103 samples of bone meal and hoof and horn products.—*Bull. Ministry of Health (England), 18, (1959): 26.*

Urinary Calculi in a 2-Month-Old Pup

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WARD R. RICHTER, D.V.M.

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NUMEROUS THEORIES have been advocated as likely causes of urolithiasis in the dog. Among those which have received greatest acceptance are: (1) vitamin A deficiency, (2) ammoniacal fermentation, (3) focal infections, (4) excessive salt or mineral intake, (5) inadequate water consumption, (6) poor state of nutrition, and (7) a deficient concentration of protective urinary colloids.

In the adult dog, one or more of these, plus yet unknown factors, may be responsible for the formation of uroliths. However, when the condition occurs in pups only several weeks old, it appears unlikely that the listed factors could readily be incriminated. To date, there appears to be no satisfactory explanation for the occurrence of this condition in young pups.

REVIEW OF THE LITERATURE

The incidence of urolithiasis in the young pup evidently is not great, as indicated by the few published clinical reports found in the literature.

Vesicular calculi have been reported in 2 pups.[1] The first, a 4-week-old Cocker Spaniel submitted for necropsy, had a bladder containing "alkaline urine calculi." One week later, a litter mate was examined because of a uremic breath, pale mucous membranes, and distention of the bladder. Surgery was performed and the same type of calculus was found. These 2 cases were the first seen by the author during 30 years of practice.

Vesicular calculi were also reported in a 10-week-old Dachshund.[2] The pup had signs of hematuria and a small calculus could be palpated. Three months later, when the dog was spayed, a cystotomy was performed and a calculus ¾ by ⅝ inch in size and weighing 22 gr. was removed.

Another report[4] described a urinary obstruction lodged just posterior to the os penis in a 6-week-old male Cocker Spaniel. This may have been a calculus although it did not have the appearance of one. Another writer[3] reported having treated 2 pups with vitamin A for two years following urolithiasis without a recurrence. He failed to list the ages of these dogs.

CASE REPORT

A 2-month-old male German Shepherd Dog was referred to the college clinic at 10:30 a.m. on Jan. 22, 1959. The referring veterinarian, who examined the pup on the previous day, had palpated a hard, extremely sensitive mass in the lower abdominal cavity. Since his treatment was not effective, he referred the pup to the college clinic.

Fig. 1—Lateral radiograph showing several opaque calculi in the urinary bladder and a single urolith lodged in the urethra of a 2-month-old dog. Pointers have been used to facilitate their location.

On arrival at the clinic, the pup was quiet and depressed, with a body temperature of 102 F. A slight uremic breath was noted. He had been partially anorectic for several days, and completely so the last two days. There was no history of vomiting or

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diarrhea. The owner was unable to give any history concerning urination. On abdominal palpation, the dog showed extreme signs of pain and became tense; a mass 12 cm. in diameter could be palpated in the area of the urinary bladder.

Lateral and dorsoventral radiographs were taken (fig. 1). In both views, the urinary bladder was severely distended and coincided with the location of the palpated mass. The urinary bladder contained four 3- to 4-mm. opaque areas and the urethra, posterior to the os penis, contained one opaque area, resembling urinary calculi. The urinary bladder also contained some opaque material along its ventral border; kidney shadows appeared to be larger than normal.

An attempt to catheterize was unsuccessful. The preputial opening was about 1 mm. in diameter. The penis was atonic and could not be passed through the preputial orifice. The prepuce, penis, and testicles all seemed small for a dog this age.

Fig. 2—Severe enlargement of the urinary bladder and ureters of a 2-month-old dog. Note the bilateral distention of the kidneys.

Although the pup was a poor anesthetic risk, emergency surgery was considered necessary. Despite such special considerations as the use of preanesthesia, ether for maintenance of anesthesia, blood transfusion, supplemental oxygen, artificial respiration, and cardiac massage, the pup became cyanotic and died during surgery. The owner gave permission for a necropsy.

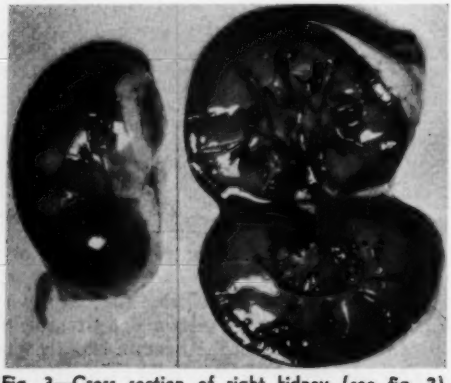

Fig. 3—Cross section of right kidney (see fig. 2), showing pelvic enlargement. Left kidney is shown intact, but greatly enlarged.

NECROPSY FINDINGS

Necropsy revealed a severe dilatation of the urinary bladder and an enlargement of the kidneys (fig. 2). Both kidneys were 8 by 5 by 5 cm. and dark red. The cortices were swollen and congested. There was severe dilatation of the pelvis in each kidney with beginning hydronephrosis, the right kidney being more extensively involved (fig. 3).

The urinary bladder was turgid, filled with urine, and measured 12 by 8 by 8 cm. Numerous small hemorrhages were scattered over the mucosal surface. At least five large calculi (3 to 4 mm.) along with many 1-mm. calculi and white sandy ma-

Fig. 4—Dissected view of bladder and urethra in a 2-month-old dog, showing location of calculi. Scissors and pointer indicate area of bladder rupture. Pointer on extreme right shows calculus lodged posterior to the os penis.

terial were found within the bladder. The large calculi were pure white, hard, and were covered with many fine-pointed projections. The hemorrhagic cystitis was most severe at the neck of the bladder near a 2- by 8-mm. sealed break in the bladder wall. The rupture had apparently occurred at least three to four days earlier and was now closed with fibrin and suppurative exudate. A large mass of omentum had adhered to the area, aiding in the process of sealing the rupture.

The urethra was hemorrhagic with a roughened traumatized mucosal surface covered by a small amount of suppurative exudate. A 6- by 5- by 5-mm. calculus was lodged just posterior to the os penis. It was similar to those found in the bladder (fig. 4).

No other related lesions were observed.

SUMMARY

Cystic and urethral calculi in a 2-month-old pup are described. The animal had extreme abdominal sensitiveness and signs of uremia. Although special surgical precautions were taken, the pup died during surgery. Necropsy revealed five cystic calculi (3 to 4 mm.), one urethral calculi (6 by 5 by 5 mm.), and a ruptured bladder.

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Simultaneous Vaccination of Mink

In the past, it has been the practice to first inject botulism type C toxoid and then wait two weeks before vaccinating with mink distemper vaccine. This necessitates rehandling the entire kit crop to immunize against distemper.

Tests indicate that the two vaccines can be given simultaneously but they must be administered in separate syringes, at separate sites; preferably, one injection is given under the skin of the front leg and the other under the skin of the thigh.—*Am. Fur Breeders (July, 1959): 27.*

Insecticide Residues in Milk

When chlorinated hydrocarbon insecticides, such as benzene hexachloride, DDT, and dieldrin were used in dairy barns or on cows, residues of the agents appeared in the milk. When organic phosphate insecticides, such as chlorthion, malathion, or Bayer 21/199 were used, there generally were no residues in the milk.—*Milk and Food Technol. (April, 1959): 115.*

Procedure for the Physician and Veterinarian in Dealing with Ringworm of the Scalp

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PROFESSIONAL RELATIONSHIPS between physicians and veterinarians, with isolated exceptions, are generally inadequate. Contacts between them are usually indirect through patients and animal owners. This situation frequently leads to misunderstandings, tactless statements, and estrangement of the two professional groups. To help improve and correct this situation, a joint committee was appointed by the New Jersey Dermatological Society and by the Veterinary Medical Association of New Jersey.

This report attempts to explain the facts underlying one of the most common problems giving rise to conflicting evaluations and recommends an approved course of action to be followed by physicians and veterinarians. Following such approved procedures will lead to better interprofessional relationships and will promote direct contact when common problems arise.

The outstanding dermatological problem is tinea capitis, ringworm of the scalp, of which three types are common in the United States. The forms caused by *Microsporum audouini* and *Trichophyton tonsurans* are anthropophitic.[4] They are passed from man to man, and do not create a man and pet animal problem.

The third type of tinea capitis, caused by *Microsporum canis*, is readily transmitted from infected animals (usually dogs and cats) to man, and also to some extent from man to man. An example of extensive transmission from animal to man was recently reported,[2] but transmission from man to animals has also occurred.[3]

Owners are frequently told to have the suspected family pet euthanatized. This decision is unwarranted, usually unnecessary, and frequently erroneous. To the veterinarian assigned such a task, there is a natural resentment at being relegated to the role of executioner without the benefit of his own professional judgment.

The authors are practitioners in Plainfield, N. J.

The following steps are recommended in suspected cases of ringworm in man:

1) When the physician makes a diagnosis of tinea capitis, he should obtain laboratory confirmation that the patient has a fungus disease. In addition, there should be, when applicable, identification of the organism as *Microsporum canis*, which could have been acquired from an animal.

An aid in the confirmation of the diagnosis of tinea capitis is a Wood's light. This reveals a fluorescent green color in the infected hairs when the infection is due to certain fungus species. This is almost always true when *Microsporum canis* infects man. Identification of the specific organism can be made in a laboratory with mycological facilities. The state departments of health and various private laboratories are so equipped.

2) As in many instances the suspected animal is not diseased, it should still be examined by a veterinarian; and when necessary, appropriate laboratory tests should be used for diagnosis and for fungus identification.

3) When it has been established that transmission from a particular animal has resulted in tinea capitis, the following steps should be taken: (*a*) It is advisable to send a report to the Board of Health, as with a "reportable" disease; (*b*) isolate the pets in a garage, basement, empty room, animal hospital, or other place that can be sanitized. This is to avoid latent infection from furniture, rugs, and other household furnishings. Dogs are responsive to therapy, but cats are more difficult to treat, so especially close cooperation between veterinarians and cat owners is desirable.

4) Prophylactic measures consist of avoidance and isolation of infected animals. Infected children need protective head coverings plus active medical therapy to improve and treat their condition as rapidly and effectively as possible. The treatment of this condition in man and pet ani-

mals is described in detail in a standard text.[1]

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Ringworm in Cattle and Foals

A serious epizootic of trichophytosis, at the State Agricultural Estate in Yugoslavia, continued from December, 1955, to June, 1958. Twenty colts were affected as well as 400 cattle. It was especially persistent in imported cattle, probably because of their weakened condition. It was finally controlled by separating newborn calves from the cows and placing them in special, frequently disinfected stables. *Trichophytosis verrucosum* was isolated in all cases. —*L. Ozegovic and R. Matie in Veterinaria, 8, (1959): 77.*

Effect of Antibiotics on *Clostridium tetani* Organisms

The toxigenicity of the bacterial cells of *Clostridium tetani* was not affected by prolonged contact with growth-inhibiting concentrations of antibiotics. Resting spores were not affected. However, oxytetracycline protected mice against heavy infection of the spores by killing the organisms at the site of injection within two days; the organism persisted for 24 days in mice given tetanus antitoxin. Since resistant strains could possibly occur, antibiotics should not be used instead of antitoxin in passive prophylaxis.—*Vet. Bull. (June, 1959): 1714.*

Iron-Dextran Can Be Carcinogenic

In an experiment with adult rats, 16 of 23 developed sarcomas in the thigh where they were given weekly intramuscular injections of 0.4 ml. of iron-dextran complex for a period of 17 months. Rats similarly given dextran in saline solution or a saccharated oxide of iron developed no tumors; necrosis occurred in some of the latter.

Weanling rats given iron-dextran complex biweekly for six injections also developed sarcomas about seven months later. The dextran fraction alone is not carcinogenic.—*Brit. Med. J. (April 11, 1959): 947.*

Tularemia in Wild Animals

A survey in southwestern Georgia and northwestern Florida revealed positive serum agglutination tests for *Brucella tularensis* in 25.0 per cent of 618 raccoons, 24.0 per cent of 136 gray foxes, 22.0 per cent of the 82 wildcats, 21.5 per cent of 311 striped skunks, 11.9 per cent of 554 opossums, 2 of 32 stray cats, 1 of 40 fox squirrels, and 1 of 188 cottontail rabbits. Of 2,004 mammals of 13 species, 17.2 per cent were positive.—*Vet. Bull. (May, 1959): Item 1337.*

Leptospirosis in Wild Mammals

Leptospiras were cultured from the kidneys of 44 of 820 trapped mammals in southwestern Georgia. Hosts not previously recorded were the gray fox, raccoon, striped skunk, wildcat, and opossum.—*Vet. Bull. (May, 1959): Item 1341.*

Respiratory Disease Agents in Lambs

Of 995 lambs examined at slaughter, *Pasteurella septica* and *Pasteurella hemolytica* were recovered from throat swabs of many normal lambs and from pneumonia lesions in 438 of the lambs. A PPLO and a virus were also recovered from lung lesions, but pneumonia could not be reproduced with either of these alone or when combined. A combination of stress and the virus seemed to provide favorable conditions for the Pasteurella, and led to pneumonia.—*A. A. H. Hamdy in Vet. Bull. (May, 1959): Item 1302.*

Bunostomum Infection in Sheep

Infection occurred in 85 per cent of sheep in which *Bunostomum trigonocephalum* larvae were introduced percutaneously, while only 14 per cent of the larvae given orally survived. Larvae were recovered from the abomasum and intestines 12 to 17 days after cutaneous inoculation.—*Vet. Bull. (April, 1959): Item 1118.*

Ornithosis in Michigan Turkeys—A Case Report

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A FLOCK of 1,000 14-month-old white breeding turkey hens, located in Michigan near the Ohio-Indiana-Michigan lines, had a poor production record. A vague illness had been noted for several weeks. There appeared little cause for alarm until 8 to 9 birds had died and 20 more visibly sickened in a three-day period. The owner had thought that histomoniasis was a problem and had treated accordingly without abating the signs of droopiness, loss of body weight, and a thick, yellowish diarrhea. These hens were on a commercial, breeder-type ration and had been vaccinated against erysipelas, Newcastle disease, and pox. Another turkey flock on the same premises appeared unaffected.

NECROPSY FINDINGS

On Nov. 10, 1958, 4 hens were submitted to the Michigan State University poultry diagnostic laboratory. One of these had lesions interpreted as those of acute histomoniasis. The other 3 had marked air sacculitis, perihepatitis, pericarditis, and mottled spleens without splenomegaly. The films of exudate over the heart, liver, and air sacs were not caseous like those usually seen in air-sac disease, but were plastic and creamy in nature. These lesions suggested ornithosis.[9] Since blood was not taken, another sample of hens was requested.

On November 13, 4 more hens were submitted. Three had no visible gross lesions, but the fourth had a marked, gelatinous pericarditis, and the peritoneal cavity was distended with a brownish ascitic fluid.

Laboratory Results.—Air-sac and pericardial exudates from turkeys in both groups were negative for bacteria. Impression smears of the pericardial exudate and spleens from the original bird sample were stained according to the Macchiavello technique. Numerous Levinthal-Cole-Lillie (L.C.L.) bodies were noted in these preparations. Serial passages of spleen material through white mice produced splenopathy characterized by enlargement and mottling. This change was observed in 2 of 3 mice from the second transfer and in 2 of 3 mice from the third transfer. One of these latter 2 also had a focal hepatitis. The L.C.L. bodies were not conclusively demonstrated from mice tissues. Serum samples were collected from each hen in the second group. Using the indirect complement-fixation method,[8] two of these samples were negative for ornithosis and two were positive beyond 1:128.*

At the time of the original examination, a provisional diagnosis of ornithosis was made, and the flock was placed under quarantine by Michigan regulatory and health officials. Medication for 14 days with 400 Gm. chlortetracycline per ton of feed effected a good clinical response. Following treatment, the birds were processed for marketing as suspects under federal poultry meat inspection. No birds were condemned, although 3 were killed before shipment because of questionable condition. According to the processing plant physician, no workers contracted ornithosis. Meanwhile, the second flock on the farm remained in apparent good health, laying at 60 per cent.

Because present evidence indicates that there is no transmission of the ornithosis virus through or on the egg in incubator conditions,[3] the eggs from the affected flock were set. Hatchability records on this set have not been seen by us.

DISCUSSION AND CONCLUSION

Since the realization a decade ago that turkeys may play an important role in the epidemiology of ornithosis, there have been more than 300 cases in man, with at least seven deaths attributed to association with affected turkeys.[5] The first such outbreak recognized was in a dressing plant in Texas in 1948, with 22 cases and three deaths in human beings. Other such outbreaks have

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Appreciation is due to Drs. W. N. Mack and J. A. Ray and their associates, Department of Microbiology and Public Health, Michigan State University, for their cooperation.

*Blood samples were run at the George Williams Hooper Foundation, University of California, San Francisco.

been reported from Texas (1953-1954),[2] Oregon (1956),[1,4] and Wisconsin (1957).[5] Periodic public health reports indicate that turkeys are an important source of ornithosis virus. The causative virus, *Miyagawanella ornithosis*, has been isolated from turkeys in California, Michigan, Minnesota, New Jersey, Oregon, Texas, and Wisconsin. This virus has also been reported from ducks and chickens in dressing plants. What were considered to be strains of low virulence were encountered clinically on two Michigan duck farms; one in 1952 and the other in 1955 to 1956.[7]

It is our belief that this is the first case of clinical ornithosis in turkeys from Michigan, although research in this state has proved that the virus of ornithosis has been present in "normal" flocks.[6]

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Response of Birds to Newcastle Disease Virus

The experimental data presented indicate that, when inoculated intramuscularly, viruses in Newcastle disease "wing-web" vaccines are less pathogenic in high concentration than in low concentration and that differences in rate of spread from inoculated to contact birds are characteristic of the particular strain of virus used.

There is considerable evidence that airborne challenge of previously vaccinated birds has a much more severe effect on egg production than does intramuscular challenge, although in susceptible birds intramuscular challenge requires less virus to kill or paralyze.

Evaluation of the data emphasizes the importance of vaccinating healthy flocks, correctly using vaccines of high potency and titer, and choosing the vaccine on a basis of individual flock need.—*A. S. Rosenwald, D.V.M. Davis, Calif., at February, 1959, Western Poultry Disease Conference, Davis, Calif.*

Toxoplasmosis in Chickens

Although chickens are a natural host for *Toxoplasma gondii*, they are remarkably tolerant to experimental infection. Only large numbers of the organisms produce disease in mature birds, and even young chickens survive infections which are generally fatal to laboratory animals such as rabbits, guinea pigs, and hamsters.

Parasitemia and acute toxoplasmosis, with proliferation and dispersal of the organisms throughout the body, could be produced but only occasionally did they persist more than two weeks. Toxoplasma were rarely found in the tissues after 40 days.—*J. Parasitol. (Feb., 1959): 31.*

Control of Infectious Synovitis

Chlortetracycline and furazolidone, each at levels of 100, 200, or 300 Gm./ton of feed, were virustatic rather than virucidal against the agent of infectious synovitis in chicks; therefore, continuous feeding gave better results than intermittent feeding. In this experiment, chlortetracycline was more effective than furazolidone.—*D. C. Shelton and N. O. Olson in Poult. Sci. (May, 1959): 575.*

Psittacosis in Chickens in Japan

Of 103 chickens tested, 16 had antibody titers (1:4 to 1:16) indicating that psittacosis virus is disseminated among chickens in Japan.—*T. Morimoto et al. in Bull. Nat. Inst. Anim. Health (Japan) No. 36 (1958): 87.*

Ronnel (Trolene) as an Anthelmintic in Lambs

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RONNEL (TROLENE) 0, 0-dimethyl 0-2, 4, 5-trichlorophenyl phosphorothioate (Dow ET-57*), is a systemic insecticide used orally for grub control in cattle,[4] with reported activity against nasal botflies in sheep,[5] and intestinal helminths in cattle.[2,6] This paper describes the efficacy of the drug as an anthelmintic in 28 lambs at different treatment levels, together with observations on its toxicity.

MATERIALS AND METHODS

In initial tests of toxicity and secondarily of anthelmintic action, 4 lambs weighing about 70 lb. were drenched once with ronnel in March, 1958. One lamb was given 400 mg. per kilogram of body weight (active ingredients) of 25 per cent wettable powder, and the other 3 were given 600 mg. per kilogram. Anthelmintic activity was measured by the use of fecal egg counts before, and at one and two weeks following, treatment. To minimize fluctuations in daily ova levels, three individual counts were made on consecutive days and averaged for each period. Sugar flotation was used in all trials to concentrate ova.

The second trial was conducted in October, 1958, on 24 lambs of mixed breeds weighing from 60 to 110 lb. All animals were held in the same pen, with common access to hay, concentrate, and water. Boluses of the drug were administered once to three groups of 6 lambs each, at the 200, 400, and 600-mg. per kilogram level (active ingredients), with 6 held as unmedicated controls. Three individual fecal samples were taken on consecutive days before treatment and averaged to give a group pretreatment ova level. Single fecal samples were then taken from each lamb and examined for ova at one, one and one half, two, three, four, and five weeks after treatment and averaged for each group.

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*Trolene was supplied by Dow Chemical Co., Midland, Mich.

RESULTS

The average reduction in ova levels in feces after treatment of the first 4 lambs (400 and 600 mg./kg.) suggested a spectrum of activity against four genera of nematodes (table 1). However, these natural infections of Haemonchus, Ostertagia, Trichostrongylus, and Strongyloides averaged only 29, 17, 4, and 269 eggs per gram of feces.

Although the recommended treatment level for cattle is 100 mg. per kilogram, none of these 4 lambs showed anorexia, muscular weakness, or diarrhea following medication at these high levels (400 and 600 mg./kg.). Two of the lambs treated at the 600-mg. level were discovered to have been bred and were about 60 and 105 days pregnant when treated. Both delivered apparently normal lambs at term.

TABLE 1—Average Reduction in Ova (%) in Feces of 4 Lambs One and Two Weeks After Treatment with Ronnel

Parasite	Weeks after treatment	
	1	2
Haemonchus	97	100
Ostertagia	100	83
Strongyloides	98	90
Trichostrongylus	71	49

In the second group of 24 naturally infected sheep, the pretreatment fecal egg counts revealed Haemonchus ova as the most abundant, with Ostertagia, Nematodirus, Strongyloides, and Trichostrongylus present in lower numbers (table 2). The ova of Trichuris, Oesophagostomum, and Cooperia were encountered infrequently and are not shown.

The average group change in numbers of ova at one to five weeks following treatment (table 3) shows that ova numbers in the unmedicated controls fluctuated irregularly above and below pretreatment means. In the medicated groups, however, the numbers of ova decreased strikingly, especially at the 400- and 600-mg. treatment levels. Trichostrongylus ova numbers are deleted in table 3 because they declined markedly in the control group, making any comparison invalid.

TABLE 2—Average Pretreatment Numbers of Ova (Eggs/Gm. Feces) for Lambs in Control and Medicated Groups

Parasite	Control	Treatment group (6 lambs each) 200 mg./kg.*	400 mg./kg.	600 mg./kg.
Haemonchus	872	2,418	2,000	1,688
Ostertagia	45	66	100	72
Nematodirus	21	14	26	31
Strongyloides	53	129	137	367
Trichostrongylus	22	13	25	21

*Active ingredients, Dow ET-57.

In contrast to the absence of signs of intoxication in the initial experiment, two of the treated groups in the second experiment showed definite reaction to medication. At two days following treatment, the animals in the 600-mg. group were sluggish and 1 lamb had tremors. Four to five days after treatment, a diarrhea was noticed which persisted for about two days; its severity appeared to be commensurate with dosage level. Similar diarrhetic manifestations have been described in a single ewe treated at the 400-mg. level.[6] One of the lambs dosed at the 600-mg. level died at five days. Necropsy revealed complete absence of food in the abomasum and intestine, with some food present in the rumen and reticulum. The lungs were congested. Two other lambs in the 600-mg. group were noticeably weak until the seventh and ninth days, post-treatment. Inappetence was most noticeable in the groups given more medication, but their return to full feed was complete by the ninth day.

DISCUSSION

The reduction in numbers of ova shown by the initial trial in 4 lambs (table 1) indicated that 400- and 600-mg. levels might be effective against Haemonchus, Ostertagia, and Strongyloides. This supposition appeared to be substantiated when a controlled trial with 24 lambs, using 200, 400, or 600 mg. per kilogram showed similar action against Haemonchus, Ostertagia, Strongyloides, and Nematodirus at all three levels of treatment (table 3).

At the 100-mg. per kilogram level in sheep, this drug has shown no anthelmintic activity,[1,7] while the 200-mg. level has been effective against Haemonchus in 2 sheep.[1] Critical tests on cattle dosed at the 100-mg. level resulted in 98 and 46 per cent reduction in Haemonchus and Ostertagia, respectively, with no effect demonstrated against Nematodirus.[2] It seems established, therefore, that this drug may exhibit anthelmintic activity in cattle at the 100-mg. level and in sheep at the 200-mg. level.

On the basis of this trial with 24 lambs,

TABLE 3—Reduction or Increase (+) of Ova (%) in Feces of Lambs One to Five Weeks After Treatment with Ronnel

Treatment group (6 lambs each)	Week	Parasite Haemonchus	Ostertagia	Nematodirus	Strongyloides
Control	1	42	+ 62	+ 6	19
	2*	36	6	54	9
	3	40	58	74	4
	4	17	+ 19	44	37
	5	37	+ 19	57	23
	Av.	34	+ 7	45	18
200 mg./kg.	1	98	71	100	99
	2*	94	62	98	96
	3	94	60	85	82
	4	93	46	75	99
	5	88	41	75	97
	Av.	93	56	87	95
400 mg./kg.	1	100	95	100	100
	2*	98	85	100	96
	3	97	85	95	98
	4	96	83	92	97
	5	97	93	97	99
	Av.	98	88	97	98
600 mg./kg.	1	100	87	100	100
	2*	100	80	100	100
	3	99	90	100	100
	4	100	92	100	99
	5	99	86	99	99
	Av.	100	87	100	100

*Average one and one half- and two-week counts.

it appears that a single treatment at the 200-mg. level will result in a marked reduction in numbers of Haemonchus, Nematodirus, and Strongyloides ova over a five-week period. Judging from toxic reactions to 400 and 600 mg. per kilogram, the 200-mg. level would likely represent the upper level of tolerance by lambs.

Bayer 21/199 (another organic phosphorous compound), at 25 mg. per kilogram, has shown a wide spectrum of activity controlling six genera of nematodes in sheep.[3] Since both of these organic phosphorous compounds exhibit a wider spectrum of activity than many currently used anthelmintics, they are deserving of further critical testing.

SUMMARY

Trolene (Dow ET-57) given as a single oral dose at 200, 400, and 600 mg. per kilogram (active drug) to a total of 22 lambs in two trials showed anthelmintic activity as measured by fecal egg counts against Haemonchus, Ostertagia, Strongyloides, and Nematodirus at all treatment levels. Anorexia, diarrhea, and muscular weakness accompanied the higher treatment schedules with death occurring in 1 of 9 lambs treated at the 600-mg. per kilogram level. The 200-mg. per kilogram dosage level probably should not be exceeded in lambs.

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No Cystic Corpora Lutea Found in Ovaries of Pregnant Cows

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Following McEntee's[1] report of a few cysts of insignificant size occurring in the corpora lutea of pregnant cows, I observed the corpora lutea of 500 pregnant cows at a slaughtering plant. No macroscopic cysts or cavities were found. The corpora lutea were selected from ovaries of cows carrying macroscopically visible fetuses which varied from a few millimeters in length to nearly full-term calves. The corpora lutea were sliced repeatedly so as not to overlook even the smallest cavities. One ovary from a cow carrying 1 fetus was found to have two identical corpora lutea, each measuring 12 by 20 mm.

Of 127 corpora lutea from nonpregnant cows, 38 (29.9%) were found to contain cysts or fluid-filled cavities. These varied from 5 mm. in diameter, in grossly normal appearing corpora lutea, to frank luteal cysts 35 mm. in diameter, with only a trace of yellow luteal tissue surrounding the cyst.

In one corpus luteum, a fluid-filled cavity 20 mm. in diameter was found. The uterus of this cow contained some straw-colored degenerating membranes and approximately 10 cc. of a straw-colored fluid, but no embryo.

Dr. Prather is a general practitioner in Manawa, Wis.

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Aujeszky's Disease in Carnivora

Of 712 mink on one farm, 523 died of Aujeszky's disease. They showed paralysis of the lower jaw, circulatory insufficiency, but no itching. Death occurred three to 20 hours after first signs of illness. The disease was believed to have been introduced in the food.

• • •

Of 39 silver foxes in one lot, 28 died of Aujeszky's disease following the feeding of pig offal. The diagnosis was confirmed by transmission in rabbits as well as histologically.—*Vet. Bull. (June, 1959): Items 1755 and 1756.*

Therapy of Experimentally Produced Bovine Cutaneous Papillomatosis with Vaccines and Excision

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CUTANEOUS PAPILLOMATOSIS (warts) is an infectious disease of the skin. It is contagious from one bovine animal to another[1] and may be considered a benign neoplastic disease. The disease is relatively common among cattle, particularly among those kept under somewhat crowded conditions such as in feedlots or in dairy herds. The disease is caused by a virus[3] which may also cause fibropapillomas of the external genitalia of cattle,[6] sarcoma-like lesions on the skin of horses,[7] and papillary tumors of the urinary bladder of cattle.[8]

The principal manifestation for which a veterinarian's services are sought is the ordinary wart of the skin. This may be a serious problem in an individual animal or it may be troublesome in a herd. The veterinarian confronted with a bovine animal or a herd with warts must develop a plan of action to fit the situation. He might either use a wart vaccine, surgically remove the warts, or use some form of topical medication. Various opinions have been given in support of the different procedures. Two experiments were designed to give information on the effectiveness of vaccine therapy and of excision. Each experiment is presented separately.

EFFECT OF COMMERCIAL WART VACCINE ON EXPERIMENTAL WARTS

Commercial wart vaccines have been used principally for treatment of warts. The claim has been made on the basis of clinical observation that such treatment has been effective.[2,4,5,10] Cutaneous papillomatosis in cattle is a self-limiting disease and the course in an individual animal is difficult to predict (fig. 1). Likewise, it is difficult to determine the stage of the disease, that is, whether the warts are in the early actively growing stage, at the peak of their growth (fig. 2), or in the stage of regression (fig. 3).

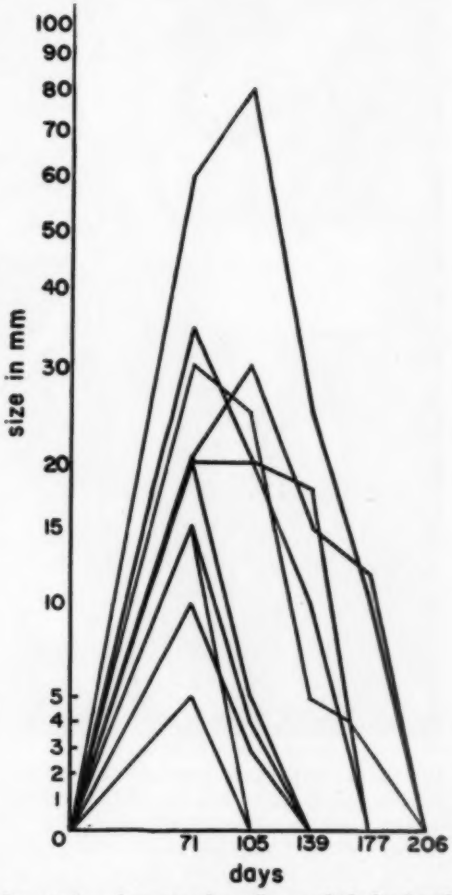

Fig. 1—Growth curves of papillomas which developed in 10 calves as the result of exposure of scarified skin to bovine papilloma agent. The curves illustrate the range of individual reactions usually obtained with a group of susceptible calves.

Because of these uncertainties, evaluation of the benefit of wart vaccine for treatment of cutaneous papillomatosis in

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Fig. 2—Ten experimentally produced warts at maximum size, five months after inoculation of a calf.

Fig. 3—Same warts shown in figure 2, 24 days later; beginning degeneration is evident in portions of the three warts encircled. The calf was not treated for warts. All ten warts subsequently regressed at about the same rate.

cattle is extremely difficult under field conditions. A trial was planned in which warts were produced experimentally on calves and wart vaccines were administered to the calves at different stages of growth of the warts.

Materials and Methods.—Sixty Hereford calves, 8 to 9 months old, were inoculated on scarified skin of the neck with 5 per cent suspension of ground wart tissue. Wart materials 215 and 216 were used so that two warts would be produced with each material. The calves were kept under good feedlot conditions and had no warts at the time of exposure. The sites of inoculation with active wart material were observed and the warts were measured at intervals.

Two commercial wart vaccines were used. One had been prepared by grinding naturally occurring bovine warts into a suspension which was then formalinized to inactivate the virus. The other was prepared by propagating papilloma virus of bovine origin in fertile hens' eggs. The actual procedure has never been published although it may be assumed that after incubation of the inoculated eggs, the membranes were harvested, a suspension formed, and the virus inactivated by formalin.

Various dosages of vaccine are recommended for treatment of warts. The usual recommendation is two injections of 25 ml. subcutaneously at ten-day

intervals for large cattle. Sometimes an additional 2-ml. intradermal injection is also advised.[5] From previous work,[9] it was found that a single injection of 5-ml. of a vaccine would induce a significant immunity against a subsequent challenge. In these experiments, the vaccines were used in a single treatment of 25 ml. subcutaneously and 2 ml. intradermally into a caudal fold. They were given 35, 63, and 91 days after inoculation with active wart material.

Each of 8 nontreated calves had four warts induced by material 215, and four warts induced by material 216. These calves also served as controls for the experiment on excision.

Results.—Essentially similar growth curves were found for the warts induced by materials 215 and 216 (these may be considered as two strains of bovine papilloma agent). The growth curves of the warts in calves treated with commercial wart vaccine of chicken embryo origin were compared to the growth curves of warts on calves which had been treated with the commercial vaccine of bovine tissue origin. The average size of the warts after treatment with chicken embryo vaccine was only slightly larger. Therefore, the data were combined for the compilation of growth curves (fig. 4).

When wart vaccine was given to calves with warts at an early stage of growth (35 days), the warts became larger than those on calves treated at midpoint (63 days), or peak of growth (91 days). When the wart vaccine was given to calves at the time when the warts were at about the middle of their growth stage (63 days), the warts became slightly larger than those on calves treated at the peak of wart growth (91 days). Wart vaccine given to calves at any stage of the growth curve seemed to cause the warts to be slightly larger at the end of the experiment than warts on nontreated animals.

REMOVAL OF SOME WARTS TO INFLUENCE THOSE REMAINING

Clinical reports[11] indicate that if some of the warts on an animal are removed, those remaining will regress.

Materials and Methods.—Sixty Hereford calves, about 8 to 9 months old and free of warts, were inoculated on scarified skin with 5 per cent suspension of ground bovine wart tissue. Two strains of wart material were used (materials 215 and 216). An attempt was made to induce four warts with each material, using both sides of the neck of each calf. Thus, if the inoculations were successful, each calf would have eight warts. Most of the calves were susceptible and warts were apparent on the majority five weeks later. The calves were kept under good feedlot conditions.

Forty days after inoculation, one half of the experimental warts were removed by excision from 10 of the calves and one fourth of the warts from another group of 10 calves. Seventy-three days after exposure, one fourth of the warts were removed from 8 calves and one half of the warts from 5 calves. About 100 days after inoculation, one fourth of the warts were removed from 3 calves and one half of the warts from 5 calves. The number of animals which could be used diminished as time went on since the warts had regressed in some of the calves which were intended for the experiment.

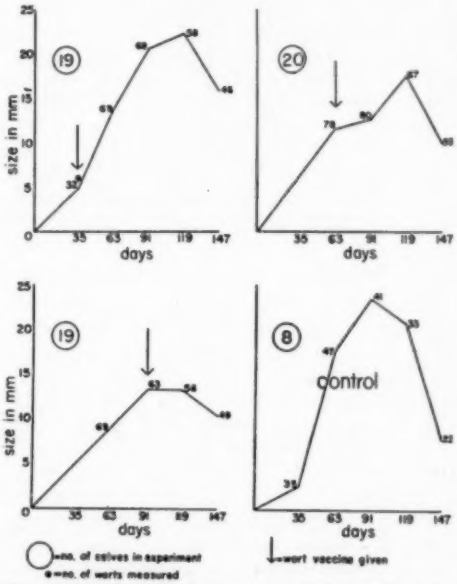

Fig. 4—Growth curves of warts on calves given commercial wart vaccine 34, 63, and 91 days after the inoculation to produce the warts. Each point on the curve is the average size of all warts on calves of the group. The wart vaccine caused no marked regression of the warts.

Observations were made on all calves five, nine, 13, 17, and 21 weeks after inoculation. The size of each wart was measured and particular attention was given to whether there was recurrence at the sites where warts had been removed.

Results.—The results were essentially the same whether one half or only one fourth of the warts were removed. The data have been pooled (fig. 5) and compared to the growth observed in 8 untreated calves.

Following removal of some warts at five and six weeks after inoculation, those remaining grew somewhat larger and lasted

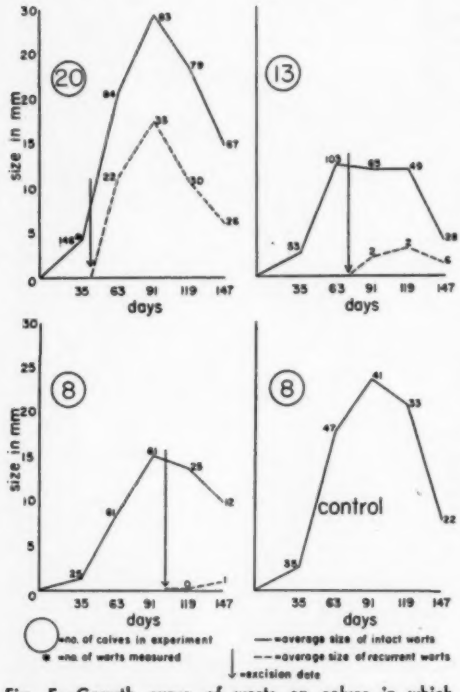

Fig. 5—Growth curve of warts on calves in which either one half or one fourth of the experimentally induced warts were removed. Since there was no essential difference whether one half or one fourth were removed, the data are pooled. Three graphs represent the growth curves when excisions were done at about 40, 73, and 100 days, respectively, after inoculation. The fourth growth curve represents the findings in control calves from which warts had not been removed. When some of the warts were removed early (at 40 days), the remaining warts grew larger than in the controls, and the recurrence of warts at the sites of excision was pronounced.

longer than the warts on control calves from which no warts had been removed or in the other calves from which some warts had been removed at a later stage of their growth. In addition, a significant number of recurrences developed at the sites where the warts had been removed. Excision of some warts at about ten or 15 weeks seemed to be followed by moderate regression in both number and size of the remaining warts. There was some recurrence of the excised warts.

DISCUSSION

When vaccine was given early, the warts grew larger than when vaccine was given later in the experimental disease. There was no apparent cessation of growth of warts as a result of the vaccine therapy.

These results probably should have been expected although the mechanisms which lead to regression of warts are still unknown. The concentration of virus is high in warts 120 days old.[9] Such actively growing warts are undoubtedly releasing some virus to the host since there is about the same concentration of virus in the connective tissue corium underlying the wart as there is in the epithelial portion of the wart.[9]

Vaccines are probably given to an animal with warts in order to introduce additional noninfectious antigenic material. The relatively large dose of 25 ml. of bovine tissue vaccine would represent about 1.25 Gm. of wart tissue. This is a minute amount in contrast to the 5 to 25 lb. of warts which may exist on an individual calf. The contrast is even more marked in the case of bovine wart vaccine prepared in the chicken embryo, where the amount of active virus is much less.[9]

Excision of some warts at about ten or 15 weeks seemed to cause moderate regression in both number and size of the remaining warts. There was recurrence at the sites where some warts had been excised. The observation that recurrence was much more likely when warts were removed in the early phase of growth was not surprising since it has been observed that removal of equine sarcoid (which is caused by bovine wart virus) is frequently followed by recurrence.[7] The observation that growth of the remaining warts increases when some are excised early was surprising and, at present, has no logical explanation.

The results indicate that surgical removal of some warts does not cause regression of the remaining warts. Actually, surgical removal of warts in the early stages of their growth seems unwise since they are likely to recur.

SUMMARY AND CONCLUSIONS

Results from either administration of vaccine or excision of some warts indicate that neither method is particularly effective in treatment of the disease. The

results do indicate that excision during the early stages, as well as vaccine therapy, may actually prolong the disease.

Warts could be excised from an individual animal, with small likelihood of recurrence, if the warts were present more than three months. If warts were a herd problem, individual animals with warts could be treated by this method and consideration given to a program of immunization of the calves with wart-tissue-vaccine for prevention of the disease. A vaccine prepared with warts from animals in the herd is preferable, and the animals should be immunized prior to exposure.

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Treatment of Bovine Coccidiosis with Sulfonamides

The results of five experiments with 49 calves experimentally infected with *Eimeria bovis* indicated that control can be obtained with lower dosage levels and fewer administrations of sulfonamides than had been previously demonstrated. A single treatment with sulfamethazine or sulfabromomethazine at the rate of 1.5 gr./lb. 13 days after inoculation effectively controlled coccidiosis, as did five treatments with either of these drugs on alternate days at the rate of 0.15 gr./lb. ten to 18 days after inoculation.

Such low-level treatment did not appreciably interfere with development of immunity. In one experiment, two treatments with sulfamethazine at 0.15 gr./lb. 12 and 14 days after inoculation suppressed coccidiosis.—[*Datus M. Hammond, Glen W. Clark, Merthyr L. Miner, W. Arlo Trost, and A. Earl Johnson: Treatment of Experimental Bovine Coccidiosis with Multiple Small Doses and Single Large Doses of Sulfamethazine and Sulfabromomethazine. Am. J. Vet. Res., 20, (July, 1959): 708-713.*]

Sulfonamide Therapy for Mastitis

Individual sulfonamides were administered by intravenous and oral routes in dosages of 0.5 and 1.0 gr./lb. of body weight. Following intravenous administration (1 gr./lb.), sulfonamides appeared in the milk in the following decreasing order of concentration: sulfamethazine, sulfapyridine, sulfamerazine, sulfadiazine, and sulfathiazole. Following oral administration (1 gr./lb.) sulfonamides appeared in the milk in the following decreasing order of concentration: Sulfapyridine, sulfamethazine, sulfanilamide, sulfamerazine, sulfadiazine, and sulfathiazole.

The concentrations of sulfathiazole found in the milk would indicate that it is of little value in mastitis therapy.

Intravenous administrations provided more rapidly detectable concentrations of sulfonamides in the milk than did oral administration, while the latter provided more persistent milk levels.—[*I. A. Schipper and D. F. Eveleth: Rates and Routes of Sulfonamide Excretion in the Cow. I. Milk Levels Following Single Intravenous and Oral Administrations. Am. J. Vet. Res., 20,* (July, *1959*): *714-717.*]

Snakes Can Harbor Equine Encephalomyelitis Virus

For the first time there is evidence that a pathogenic virus of warm-blooded animals can infect a cold-blooded vertebrate. It was found that the mosquito, *Culex tarsalis,* which transmits encephalomyelitis virus, can feed on garter snakes and that the latter are susceptible to the virus.—*Sci. News Letter (Feb. 21, 1959): 121.*

Atrophic Rhinitis and Nutrition

Examination of sagittal sections of the heads of slaughtered swine, in Denmark, revealed varying degrees of atrophy of the turbinate bones, with or without lesions of the mucosa, even in animals with no evident deformity of the snout. During September, 1957, 43 of 75 normal appearing heads examined were affected, some having total atrophy of the turbinates. These animals had been raised on farms where vitamin and mineral requirements were supplied by supplements and the main constituent of the diet was grain, usually barley mixed with water. Skim milk was fed when available which usually was only in the summer. The carbohydrate intake of a 70-kg. (154-lb.) shoat was five times that of a man on a predominantly carbohydrate diet.

It was suggested that atrophic rhinitis could be controlled by selecting breeding gilts at weaning time and raising them separately on a better balanced diet.—*Vet. Bull. (April, 1959): Item 1175.*

✦ ✦ ✦

After examining snouts of 15,000 swine, in Sweden, evidence of atrophic rhinitis was found to be most common in young pigs, with some indications that it could have originated in fetal pigs. It seemed most common in rapidly growing pigs as if it could result from metabolic disturbances or abnormally rapid growth. Infection played a major role but was considered secondary to bone changes.—*Vet Bull. (April, 1959): Item 1176.*

Effect of Intravenous Glucose on Appetites of Ewes

Comparison of feed consumption among adult ewes given intravenously either: (1) 50 per cent glucose, (2) 0.9 per cent saline solution, and (3) noninjected controls, indicates that appetite is not altered in sheep by high levels of blood glucose.

Minimum blood glucose levels during the feeding period varied from 175 mg./100 ml. to 1,480 mg./100 ml. in the glucose-injected ewes and from 36 mg./100 ml. to 67 mg./100 ml. in the saline-injected and control ewes. Mean feed consumption values for ewes given glucose were, with one exception, uniformly increased over the mean for saline-injected or noninjected control ewes but the difference was not statistically significant.

These results indicate that glucose is not a key metabolite in the short-term regulation of food intake in adult ruminants. Acetic and propionic acids are discussed as possible alternative appetite regulators.—[*Robert L. Manning, G. I. Alexander, H. M. Krueger, and Ralph Bogart: The Effect of Intravenous Glucose Injections on Appetite in Adult Ewes. Am. J. Vet. Res., 20, (March, 1959): 242-246.*]

Stress and Nutrition

Stress alters the nutritional requirements of all types of warm-blooded animals. It is produced by an imbalance in the pituitary-adrenal system, an imbalance which is always in the direction of increased activity and, therefore, increased demand for nutrients to repair cell damage.

Amino acids, B complex vitamins, and energy are usually needed in amounts not supplied by the ration, because cell activity increases the need while failing appetite decreases the intake. Depletion of body reserves leads to signs of deficiency in a short time.—*R. C. Klussendorf, D.V.M., in Iowa Vet., 3, (May-June, 1958): 20.*

Effect of Antibiotic on Health and Growth of Young Calves

The feeding of chlortetracycline at levels of 250 to 1,000 mg./day for the first three days of life of dairy calves, at the Louisiana Agricultural Experiment Station, resulted in a reduction in enteritis and deaths. The 250-mg. dose was as effective as the higher levels.

When the treatment was terminated at three days, there was no stimulation in growth. The feeding of 50 mg. of this antibiotic per day, starting at 4 days of age, resulted in a significant increase in growth (approx. 18%) at 16 weeks of age regardless of treatment the first three days.

Growth stimulation could not be explained entirely by a reduction in disease and probably involves a metabolic or endocrine effect.—*J. Dai. Sci. (May, 1959): 856.*

Pullets fed reserpine, 2 mg./kg. of feed, at the Oklahoma Agricultural Experiment Station, consumed significantly less feed than controls but also produced fewer eggs, which tended to nullify the advantage of feed saved.—*Poult. Sci. (May, 1959): 535.*

Advantages of a Rural Background for Veterinarians

The old adage that "grass in the other pasture always looks greener" might need to be explained to many persons in the increasing majority of Americans who have only an urban background and little or no knowledge of such things as pastures.

As applied to modes of life, probably only those who have experienced how "green" are the "pastures" of farm, village, city, and metropolitan life can fully appreciate the findings of an investigation which is reported on page 299 of this issue. One limited scientific study could be wrong, but this one supports the observation that farm-raised boys have a distinct advantage in certain veterinary fields.

The "Essentials of an Acceptable Veterinary Medical School" states that "character, personality, health, *experience with animals*, general knowledge, and motivation" of the applicant should be considered. This is good; however, even some members of the Council on Education doubted the value of "experience with animals" such as most farms provide.

It should be obvious that veterinarians without a rural background are handicapped when they attempt to advise rural people, as many must. Less obvious, but still important, is the need for practical knowledge of all animal life for veterinarians who do not deal directly with rural folks. Few will deny that, as a rule, human patients get better medical service if they are examined first by a physician in general practice who then directs them to the specialist best qualified to help them. Specialists often lack an adequately broad knowledge of human nature and of medicine. Likewise, the veterinarian with a limited knowledge of animal nature is limited in the service he can give.

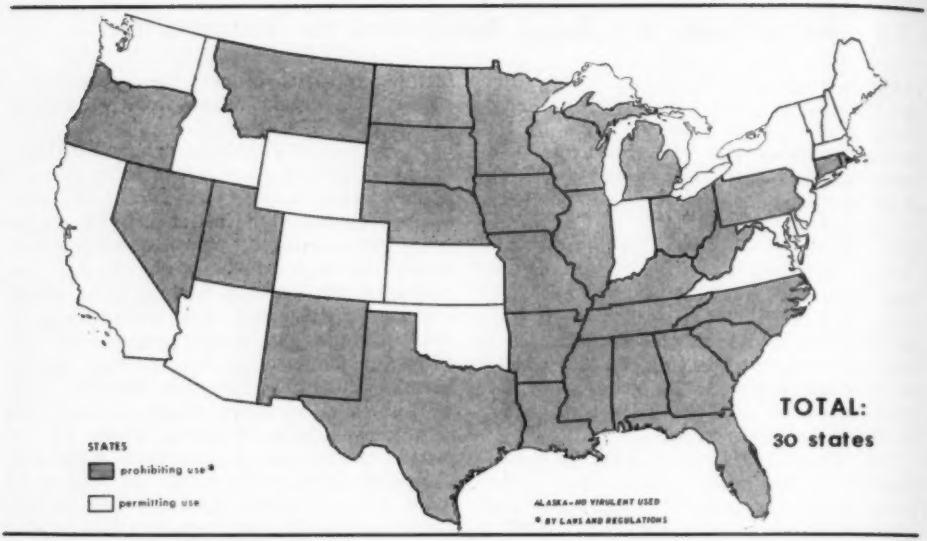
Another factor makes early, intimate experience with general animal life even more important today than formerly. Then, all veterinary schools gave courses in clinics at least by the third year; urban youth thus learned to handle animals before their impressionable, formative years were past. Today the clinical courses start only after at least four years in college, when the student is mature and when he may tend to avoid the handling of animals, either because he hesitates to show his lack of adeptness or because he, by then, considers such procedures as being menial. In most other nations, "zootechniques" is closely allied with veterinary medicine.

In the article cited, the author cautiously states that "a rural background is more of an asset than a liability." He then speculates that the initial inferior grade point averages of the rural students might be due to their inferior high school preparation. Other personal factors being equal, rural students could be expected to make lower grades in preveterinary courses. However, because of their greater familiarity with animal life and problems, they should excel as their veterinary training progresses. This advantage could be expected to increase during their early professional life, particularly if they work with food-producing animals. The reverse would occur if a city boy and a farm boy went out for freshman football. The former probably would have had much experience and coaching, the latter little if any. If their natural abilities were equal the city boy might make the varsity his first year; the farm boy only as a senior.

When one watches the regimented play and activities of city children, commonly conducted as part of a program to forestall juvenile delinquency, it is obvious that they should be better prepared than their rural counterparts for group activities. However, what about the development of their self-reliance, independence, and their sense of responsibility? Even in villages it is difficult to find chores that develop responsibility comparable to that of the farm child who has demanding lambs, pigs, calves, etc. to care for. City youngsters live and compete in a man-made synthetic world with little chance to learn about nature. Synthetic things are fine for such as engineers but, more than any other group, veterinarians must know nature.

The author of the article cited logically suggests that the country applicant may do better as a veterinary student because of "motivational factors" and because of being "more stimulated by veterinary medicine courses" than the urban student. He might also have surmised that the self-confidence of the students could be expected to increase in proportion to their early experience with animals.

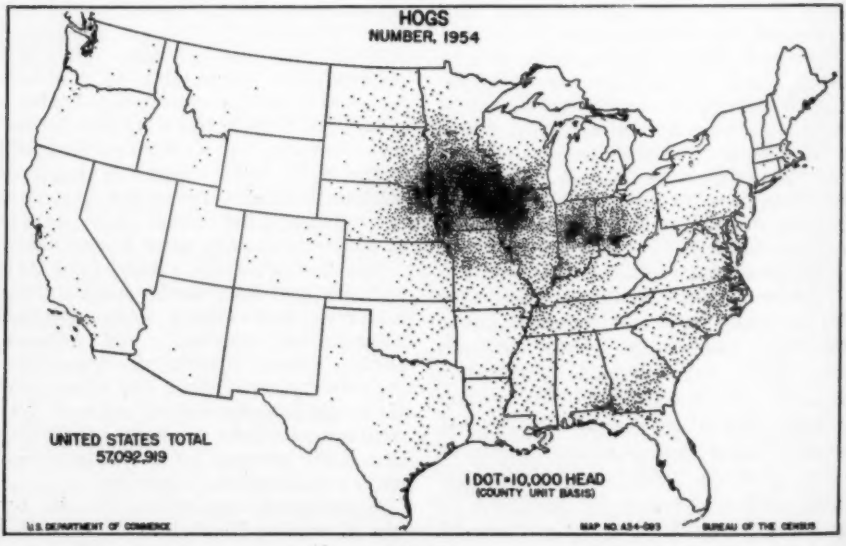
Committees responsible for the screening of applicants might well heed the findings indicated in the cited article.



Map 1

Thirty States Now Restrict the Use of Virulent Hog Cholera Virus

As of Aug. 1, 1959, 30 states (Map 1, above) have enacted legislation which either outlaws the use of virulent hog cholera virus completely or with limited and specific exceptions. This is an addition of seven states to those previously reported (JOURNAL, June 1, 1959: 496). Approximately 86 per cent of the nation's swine are raised in these 30 states (Map 2, below). Of the major swine-producing states, only Indiana (8.0%) and Kansas (1.8%) are not included. Although the number of states has only doubled in the past 18 mo. (JOURNAL, Jan. 1, 1958: 50), percentage of swine produced in the states involved has increased from 31 to 86.



Map 2

ABSTRACTS

Frothing of Ruminal Digesta

Quantities of malonic, malic, citric, and succinic acids equivalent to a final concentration of M/100 added to 50-ml. portions of strained fresh ruminal fluid increased the rates of formation of froth and thus the volumes of froth during the periods of more rapid formation of the froth.

Eluted portions of extracts of legumes, chromatographically similar to the above acids, produced increased rates of frothing of samples of ruminal contents in a similar manner.—[*R. E. Nichols and Katherine Penn: Increases in the Frothing of Samples of Ruminal Digesta Following the Addition of Certain Nonvolatile Organic Acids of Legumes. Am. J. Vet. Res., 20, (May, 1959): 445-447.*]

Studies of Tissue Suspensions Containing Foot-and-Mouth Disease Virus

Infected suspensions heated at 56 C. through 85 C. for 30 minutes through 24 hours were inoculated in cattle, guinea pigs, cultures of calf kidney cells, and suckling mice. The infectious property was destroyed by heating at 80 C. for six hours but not at 80 C. for four hours as demonstrated in cattle after inoculation of small volumes. Large doses which were heated at 80 C. for six hours were infectious for cattle.

Infectivity was not demonstrable when suspensions were heated at 85 C. for six hours and inoculated in large doses by several routes in cattle, although when heated for four hours at 85 C. and inoculated as before, infectivity was demonstrated. Heating at 56 C. for 24 hours did not inactivate the virus or affect complement-fixing activity of the antigen.

Complement-fixing activity was decreased when the suspensions were heated at 70 C. for 30 minutes and destroyed above 70 C. for longer than 30 minutes. Considerations for future work and implications of heat inactivation in the virus field are discussed.—[*G. T. Dimopoullos, O. N. Fellowes, J. J. Callis, G. C. Poppensiek, A. G. Edward, and J. H. Graves: Thermal Inactivation and Antigenicity Studies of Heated Tissue Suspensions Containing Foot-and-Mouth Disease Virus. Am. J. Vet. Res., 20, (May, 1959): 510-521.*]

Patterns of Serum Protein after Freezing

No significant changes in the electrophoretic patterns of sheep serums occurred in the albumin, *alpha*-1 globulin, *alpha*-2 globulin, and *gamma* globulin fractions as a result of nine months' storage at −20 C. A small, but significant, increase occurred in the *beta* globulin fraction apparently due to storage.

There was no significant change in the electrophoretic patterns as a result of freezing at −20 C., although quick freezing at −70 C. produced a small but significant increase in the albumin fraction.—[*Kenneth L. Kuttler and Donald W. Marble: The Effects of Freezing and Storage at −20 C. on Serum Protein Patterns of Sheep as Determined by Paper Electrophoresis. Am. J. Vet. Res., 20, (May, 1959): 434-436.*]

Treatment of Foals for Gastrointestinal Parasites

Piperazine-carbon disulfide complex (Parvex suspension) was found to be nontoxic to foals when administered at the rate of 150 mg. per kilogram of body weight, and no blood changes were observed following treatment.

This suspension was shown to have 100 per cent efficacy in the removal of *Parascaris equorum* at dosages of 150, 100, and 75 mg./kg. of body weight. Both immature and mature ascarids were removed.

The suspension given at the rate of 150, 100, and 75 mg./kg. of body weight showed high efficacy (93 to 97%) against small strongyles. The same dosages caused adult Oxyuris to be passed.

Second and third instars of *Gasterophilus intestinalis* and *Gasterophilus nasalis* were effectively removed by the suspension when given at the rate of 150, 100, and 75 mg./kg. of body weight.

Treatment of foals with CS_2 after being treated with the suspension did not remove a significant number of parasites, but treatment with the suspension after a previous treatment with CS_2 resulted in the removal of ascarids, pinworms, and bot larvae.—[*David T. Clark and Nolen D. Connor: Field Tests on the Efficacy of Piperazine-Carbon Disulfide Complex in the Treatment of Foals for Gastrointestinal Parasites. Am. J. Vet. Res., 20, (May, 1959): 452-458.*]

BOOKS AND REPORTS

Metals and Engineering in Bone and Joint Surgery

This small, thought-provoking book is an excellent introductory summary of current knowledge of the special compromise of biological and engineering principles essential to modern use of metal aids in fracture treatment and replacement parts. It should be of considerable value and interest to those veterinarians designing and developing intramedullary devices and metallic prostheses. Of general interest is the fact that so much of the experimental work was done in dogs. Hey-Groves was placing intramedullary pins in the tibia of dogs in 1913! The information on the "battery effect" of metals in the body, metallic transfer, metal behavior, the best available metals, and use and care of metals will be of value to all veterinarians using modern orthopedic methods.—[*Metals and Engineering in Bone and Joint Surgery. By Charles O. Bechtol et al. 186 pages. Williams and Wilkins*

Co., Mt. Royal Ave., Baltimore, Md. 1959. Price $8.00.]—R. L. LEIGHTON.

Elementary Statistics

The author designed this book to show medical men who have only a modest knowledge of mathematics how statisticians arrive at their results, how they interpret statistics, and how they test their validity. He provides numerous examples from fields of investigation familiar to medical research workers.

With the profusion of tables, graphs, and statistical formulas found in today's medical literature, veterinarians and others in the biological sciences have an increasing need for a knowledge of statistics.

One entire chapter deals with the *chi*-square test; other portions treat in detail such topics as tabular and graphic presentation, frequency distribution, correlation of grouped and ungrouped data, the arithmetic mean, the median, and the mode.—[*Elementary Statistics with Applications in Medicine and the Biological Sciences. By F. E. Croxton. 376 pages; paperbound. Dover Publications, Inc., New York, N.Y. 1959. Price $1.95.*]

Perspectives in Virology

This is an outstanding contribution in which specialists report on various fields of virological research. The book is dedicated to the late F. R. Beaudette whose many friends and colleagues will read with interest and warm personal feeling the foreword, "Fred Beaudette as Friend and Scientist," by Selman A. Waksman.

Among the subjects discussed are the chemical content of viruses, genetic manifestations, host-parasite relation and viral multiplication, ecology, epidemiology, and application of fundamental virology to the development of vaccines. Viral neoplasia receive major attention.

The comprehensive introduction to the present knowledge of virology, the potentialities for future investigations and the discussion of the papers by many eminent virologists make this an interesting, informative, and fascinating book. It is highly recommended for all whose interests are in virology.—[*Perspectives in Virology. Edited by Morris Pollard. 320 pages. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N.Y., 1959. Price not given.*]—C. N. CUNNINGHAM.

Fungal Diseases of Animals

The authors, two eminent British mycologists, have attempted the difficult task of compiling a comprehensive review of the literature on the animal mycoses. They have succeeded admirably in this undertaking and the book is to be regarded as a valuable contribution to veterinary medicine. It is a welcome volume, since it effectively summarizes for the first time in English the extensive literature on this subject. Heretofore much of the information presented could only be obtained through laborious library research.

The book is written simply and clearly and the chapter format has been arranged in a logical manner. Among the contents are two chapters concerned with the mycotoxicoses of animals. The inclusion of these noninfectious disorders is especially welcome, since few attempts have been made in the past to summarize the available knowledge on this interesting phase of veterinary mycology. The remaining 15 chapters are devoted to the infectious mycoses, including a section on mycotic mastitis and one on bovine mycotic abortion. The book contains an excellent bibliography and index. Supplementing the text are eight black-and-white and four color plates. The figures presented in color are of the finest quality.

It was not the intention of the authors to prepare a textbook on veterinary mycology. Accordingly, the techniques employed in the laboratory diagnosis of fungus infections are not described in detail. Likewise, the cultural characteristics of many of the causative agents are described in an abbreviated form and are not accompanied by adequate illustrations. Consequently, students of veterinary mycology would require additional sources of information.

This book is an excellent summation of the literature on the fungal diseases of animals and it should find wide acceptance and use by veterinarians, mycologists and others interested in such a publication.—[*Fungal Diseases of Animals. By G. C. Ainsworth and P. K. C. Austwick. 148 pages. Commonwealth Agricultural Bureaux, Farnham Royal, Bucks, England. Price $2.80.*]—WILLIAM KAPLAN.

Endocrinology of Reproduction

This book reports the proceedings of the State University of New York Upstate Medical Dedication Year Conference on the Endocrinology of Reproduction held in Syracuse, N.Y., in June, 1958.

The conference brought together basic investigators and clinicians some of whom were asked to report on their own investigations or the latest developments in their area of specialization. The resulting reports and discussions appear not only to have pointed the way to intriguing paths of investigation for nonclinical scientists, but to have indicated ways for the physician clinician to treat his patients.

Although several contributors were engaged in dairy or veterinary research in England, most of the authors and discussants dealt mainly with the endocrinology of human reproduction. The book will have only limited value to practicing veterinarians, but would be a worthwhile addition to the library of veterinary research workers.—[*Recent Progress in the Endocrinology of Reproduction. Edited by Charles W. Lloyd. 532 pages; illustrated. Academic Press Inc., 111 Fifth Ave., New York 3, N.Y. 1959 Price $12.00.*]

THE NEWS

Dr. George H. Hart
1883–1959

★George H. Hart (UP '03), 75, Davis, Calif., dean emeritus of the School of Veterinary Medicine, University of California, since 1954, and internationally-known authority in veterinary science and animal husbandry, died on Aug. 2, 1959.

Born in Philadelphia, Pa., Oct. 10, 1883, Dr. Hart received his V.M.D. degree at the University of Pennsylvania at the age of 20. He then was appointed assistant in bacteriology and pathology, Pathological Division, Bureau of Animal Industry, U.S.D.A., Washington. While there, he studied medicine at George Washington University and received an M.D. degree in 1908.

From 1908 to 1910, he was assigned to tick fever eradication and accepted a position there as city veterinarian with the Los Angeles health department, where he served for seven years.

In 1917, he was appointed associate professor of veterinary science at the University of California, in Berkeley and, in 1924, was made a professor.

In 1926, Dr. Hart was appointed professor and head of the division of animal husbandry and served until 1948, when he became dean of the newly established School of Veterinary Medicine on the Davis campus.

During his years in the veterinary science department, he was a member of the research teams who made notable contributions to animal disease control; such as, Drs. Hart, Harding, Traum, Woods, among others, who collaborated on studies of bovine tuberculosis, brucellosis, and blackleg as well as in diseases of other species.

Later, when his attention was mainly on the animal husbandry field, Dr. Hart and coworkers published the results of many independent or collaborative studies on nutritional diseases, endocrine disturbances, and photosensitization.

Always active in professional and scientific circles, he joined the AVMA in 1910, was a member of its Committee on Intelligence and Education (forerunner of the Council on Education) as early as 1916; represented District VI on the Executive Board from 1926 to 1931; was one of the first Research Council members (1941-1950) to represent the field of biochemistry and nutrition; was a member of the Committee on Legislation (1934-1939); and of the Committee on Nutrition (1942-1947). In addition, he was vice-president of the AVMA in 1915-1916, 1918-1919, 1922-1923, and in 1923-1924.

During his career, Dr. Hart received many honors and was called to serve on many scientific and advisory bodies including: the

Dr. George H. Hart

Twelfth I.V.C. Prize in 1938; the Borden Award and Medal in 1953; the National Research Council Committee on Animal Health, 1943-1944—its committees on animal nutrition, veterinary services, and training of research works, 1944-1947; N.R.C. delegate to the Seventh Pacific Science Congress in Auckland, N.Z., 1949; and a Fullbright lecturer at the University of Sydney, Australia, in 1955.

He was also past president of the American Society of Animal Production (1939). In 1947, the Saddle and Sirloin Club in Chicago, Ill., honored him by displaying his portrait there.

Dr. Hart was also a member of A.A.A.S., the American Association of University Professors, the U.S. Livestock Sanitary Association, the Society of Experimental Biology and Medicine, the honorary society of Sigma Xi, Delta Tau Delta, and others.

He is survived by his widow, the former Mrs. Theresa Dennis.

U.S.D.A. Recruiting Veterinarians for Poultry Inspection

The U. S. Department of Agriculture has announced that it is seeking graduate veterinarians to serve as inspectors in poultry-dressing plants throughout the United States.

An announcement, "Opportunities for Veterinarians in Federal Poultry Inspection," has been mailed to approximately 14,500 practicing veterinarians in the United States and Canada and to 980 June graduates of schools of veterinary medicine.

The increased need for graduate veterinarians in poultry inspection work is a result of recent legislation establishing compulsory federal inspection of poultry in all plants engaged in interstate commerce.

While most of the government positions are full-time, there are others available on a seasonal basis, and also some that would require only a few hours per day in supervising the work of nonprofessional inspectors.

Interested veterinarians are invited to request additional information from one of three personnel offices of the U.S.D.A.'s Agricultural Marketing Service: for the eastern states, U. S. Department of Agriculture, Washington 25, D.C.; for the central area, 536 South Clark Street, Chicago 5, Ill.; for the Western states, 2180 Milvia Street, Berkeley 4, Calif.

Southern Branch, A.P.H.A., Meeting in Miami Features Zoonoses and Veterinarians

The twenty-seventh annual meeting of the Southern Branch of the American Public Health Association, which comprises 17 southern states, convened at the Hotel McAllister, Miami, Fla., May 27-29, 1959.

Two panels of the joint biology and laboratory sections featured zoonotic topics and included many southern veterinarians from public health and private practice. Among those on the program were:

Rabies control—Dr. James Scatterday, Jacksonville; Dr. Martin Hines, Raleigh; Dr. Luther Fredrickson, Nashville; Dr. L. E. Starr, Atlanta; and Dr. Robert Knowles, Miami.

Leptospirosis—Dr. L. E. Starr; Dr. Martin Hines; Dr. Arthur Lewis, Jacksonville; and Dr. Charles Bild, Miami.

A panel on arthropod-borne diseases and two additional panels covering allied disciplines made up the final session. At the business meeting of the biology section, Dr. Luther Fredrickson, Nashville, was nominated chairman of the 1960 meeting to be held in Memphis, and Dr. Charles Caraway, New Orleans, was nominated secretary.

s/DWIGHT L. LICHTY, *Secretary, Biology Section, Southern Branch, A.P.H.A.*

Iowa State College Becomes a University

Iowa State College of Agriculture and Mechanic Arts officially became Iowa State University of Science and Technology on June 4, 1959.

The Division of Veterinary Medicine has become the *College* of Veterinary Medicine. These changes have occurred in the first year of Iowa State's second century.

Current enrollment figures at the University are between 9,000 to 10,000 students. An increase of from 3,500 to 5,000 students is predicted for the early 1960's.

Four Veterinarians Elected to the American Association of Neuropathologists

Four veterinary pathologists were elected to membership in the American Association of Neuropathologists at its thirty-fifth annual meeting in Atlantic City, N.J., on June 16, 1959.

They join Dr. J. T. McGrath of Philadelphia, Pa., who for five years has been the first and only veterinarian in this society. The new members are: Drs. J. R. M. Innes, Upton, N.Y.; T. C. Jones, Boston, Mass.; E. L. Jungherr, Pearl River, N.Y.; and L. Z. Saunders, Philadelphia, Pa.

The Association is composed mainly of physicians doing research in neuropathology, and the election of these new members recognizes the contribution of veterinary pathologists to the specialty field of neuropathology.

Graduate Fellowships Approved Under the National Defense Act—Now in Operation

Allocation of over $4 million for an additional 842 graduate fellowships under the National Defense Act was announced in June.

This made available 232 new or expanded graduate programs in addition to those inaugurated in the initial appropriation of $800,000. A total of 272 new or expanded graduate programs and 123 institutions are participating. Selection was made from among 1,038 programs proposed by 168 colleges and universities.

Of the 1,000 fellowships made available under the Act, in this its first year, 997 recipients had been selected as of August 12.

In the field of veterinary medicine, Kansas State University was granted three graduate fellowships for 1959-1960. To date, the two Fellows selected are: Drs. William J. Griffing (KSC '44), Bremen, Ind., and Maurice W. Hull (KSC '45), Clay Center, Kan.

Each fellowship is for three years. The National Defense Act also provides for an additional 1,500 fellowships to be granted for the next three academic years; making a total of 5,500.

Stipends of $2,000 for the first year of study, $2,200 for the second year, and $2,400 for the third year, as well as $400 a year for each dependent, are also included. In addition, the various institutions may be reimbursed up to $2,500 per Fellow, to cover the cost of his education.

AMONG THE STATES AND PROVINCES

California

Charles S. Travers, who retired as executive secretary of the California V.M.A. at the Association's convention in Santa Monica last June, is shown holding a plaque awarding him honorary membership in the state association.

On the wall is another plaque presented to Mr. Travers by the Southern California V.M.A. for work "well done."

Illinois

Illinois Veterinarians Establish Research Grant.—The Research Fellowship of the Illinois State V.M.A., the first of its kind to be established by a state veterinary medical association, has been granted for the coming year to Dr. M. L. Kaeberle (COL '54), instructor in clinical medicine in the College of Veterinary Medicine at the University of Illinois.

Dr. Kaeberle received the B.A. degree from the University of South Dakota in 1950; the B.S. degree from Colorado State University in 1952; and the D.V.M. degree from Colorado State in 1954.

He then joined the staff of the Department of Surgery and Medicine, School of Veterinary Medicine, at Kansas State University. From 1955 to 1957, he served as veterinary epidemiologist on an extensive rabies research project with the U. S. Public Health Service and, in 1957, he joined the staff of the University of Illinois. He will receive the M.S. degree in Veterinary Medical Science in February, 1960.

Dr. Kaeberle is a member of Phi Beta Kappa, Phi Kappa Phi, and other honorary organizations, including Phi Zeta. He has been the recipient of the Borden Award, the Roud McCann Scholarship, a University of South Dakota tuition scholarship, and a University of Illinois fellowship.

Indiana

Wabash Valley Association.—The Wabash Valley V.M.A. met April 15, 1959, at the Honeywell Memorial Building, Wabash. The event was a joint meeting of the veterinarians and physicians of the area.

A discussion on "Rabies Control" was presented by Dr. Joe Salisbury, State Board of Health, Indianapolis.

The Association's current roster is as follows: Drs. Edwin L. Hill, Marion, president; Jay Matchett, Greentown, president-elect; Carlton Stanforth, Galveston, vice-president; and Oscar Wesson, Culver, secretary-treasurer.

s/EDWIN L. HILL, *President.*

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Women's Auxiliary.—Meeting in conjunction with their veterinarian husbands, the Women's Auxiliary to the Wabash V.M.A. heard a discussion on interior decoration as part of their program.

The Auxiliary's officers for this year are: Mrs. Edwin L. Hill, Marion, president; Mrs. Jay Matchett, Greentown, president-elect; Mrs. Carlton Stanforth, Galveston, vice-president; Mrs. Carl Wesson, Culver, secretary-treasurer; and Mrs. William Lamkin, Marion, public relations representative.

s/DR. EDWIN L. HILL, *President of the Wabash V.M.A.*

Michigan

M.S.U. Receives Grant to Continue Cancer Study.—A cancer research project in the College of Veterinary Medicine at Michigan State University will be continued and expanded as a result of a $5,000 grant from the Ingham County Cancer Society.

Dr. W. W. Armistead, dean, reports that the funds will go toward support of a project being directed by Dr. Esther M. Smith (Ph.D.), assistant professor of anatomy. Her work concerns a study of mast cells from certain tumors.

It is believed by some that the mast cell may be concerned with the spreading of cancer in human beings because such cells are often associated with lesions known to be malignant.

The mast cell may be associated with the production of enzymes which aid in spreading the disease from one organ of the body to another.

Minnesota

Dr. Driver Retires as Federal Veterinarian in Charge.—Dr. Fred C. Driver (IND '10) had been engaged in regulatory work for the federal government for more than 44 years at the time of his retirement in December, 1958. He had been veterinarian in charge of the cooperative

Dr. Fred C. Driver

animal disease control and eradication activities for the U. S. Department of Agriculture's Animal Disease Eradication Division activities in Minnesota, since 1945.

A native of Indiana, Dr. Driver engaged in private practice in Jasper, Ind., before entering federal service in 1914. He was appointed as a meat inspector on the St. Louis, Mo., force in 1915. In 1916, he was transferred to Little Rock, Ark., where he worked on tick eradication until he entered military service during World War I.

Dr. Driver remained in federal regulatory service until his retirement, except for the period 1924-1926, when he was chief meat inspector for the city of Fort Smith, Ark. Dr. Driver was assistant veterinarian in charge at St. Paul, Minn., until 1935. He was then transferred to Baton Rouge, La., to lead the accelerated drive to eradicate tuberculosis. In 1938, after the successful completion of the tuberculosis eradication campaign in Louisiana, he was transferred and promoted to veterinarian in charge at Bismarck, N. Dak., a position he held until his transfer to St. Paul in 1945.

Dr. Driver pioneered the use of the brucellosis milk ring test in this country and was awarded the Department's Superior Service Award for this work. Dr. Daniel F. Werring (see the next column) succeeded him.

Dr. Werring Succeeds Dr. Driver as Federal Veterinarian in Charge for Minnesota.—Appointment of Dr. Daniel F. Werring (ISC '40) as veterinarian in charge of the U. S.

Dr. Daniel F. Werring

Department of Agriculture's Animal Disease Eradication activities in St. Paul, Minn., became effective Dec. 31, 1958.

Prior to his assignment in Minnesota, he had been director of Animal Livestock Diseases, State-Federal Programs, in Nebraska, since May, 1955.

Dr. Werring is a native of Minnesota having grown up in Springfield. After graduation, he joined the former Bureau of Animal Industry on the Minnesota field force and remained there until 1947, when he was transferred to Mexico to participate in the campaign to eradicate foot-and-mouth disease. His final assignment was as co-director of the Mexican-United States commission for the prevention of foot-and-mouth disease. In September, 1953, he returned to the United States as assistant veterinarian in charge at the St. Paul, Minn., station.

Dr. Werring replaces Dr. Fred C. Driver who retired after many years of federal service.

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Dr. Mainwaring Appointed Assistant Federal Veterinarian in Charge for Minnesota.—Dr. G. T. Mainwaring (OSU '43) was appointed assistant veterinarian in charge of the U.S.D.A.'s Animal Disease Eradication Division activities in St. Paul, effective in December, 1958. There was no previous incumbent for this office.

Dr. Mainwaring was formerly assistant veterinarian in charge in the Albany, N. Y., office—a post he held from January, 1957. Prior to this, he was: assigned to field work out of the Columbus, Ohio, A.D.E. office from

Dr. Glyndwr T. Mainwaring

November, 1952 to January, 1957; a general practitioner in Ohio from 1946 to 1952; and a member of the Veterinary Corps from 1943 to 1946.

s/E. J. JOLLY, *Regional Personnel Officer.*

North Dakota

State Association Meeting.—The fifty-fourth annual meeting of the North Dakota V.M.A. was held in the Provident Life Auditorium, Bismarck, June 14-16, 1959.

Out-of-state speakers on the program were: Drs. B. W. Kingrey, Iowa State College—digestive disturbances of cattle; H. J. Hill, Colorado State University—beef cattle improvement research and bull testing; and V. D. Stauffer, Arvada, Colo.—equine practice.

Officers elected at this meeting were: Drs. George T. Kreiger, Williston, president; R. C. Reed, Hillsboro, vice-president; and Dean E. Flagg, secretary-treasurer.

s/DEAN E. FLAGG, *Secretary.*

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Women's Auxiliary.—The annual meeting of the Women's Auxiliary to the North Dakota V.M.A. was held at a luncheon in the Grand Pacific Hotel, on June 16, with 40 members present.

Mrs. D. K. Christian, Moorhead, Minn., reported on the AVMA meeting in Philadelphia.

The Auxiliary voted to contribute to the AVMA Student Loan Fund and to add a contribution to the AVMA Research Fund.

Newly elected officers are: Mrs. R. C. Reed, Hillsboro, president; Mrs. D. E. Flagg, Bismarck, vice-president; Mrs. J. B. Watkins, Minot, secretary; Mrs. J. L. Bringgold, Valley City, treasurer; Mrs. D. F. Eveleth, Fargo, membership chairman; and Mrs. L. G. Best, Wahpeton, historian.

Oklahoma

State Association's Current Roster.—Officers of the Oklahoma V.M.A. for 1959 are: Drs. J. B. Corcoran, Stillwater, president; Charles Kelsey, Lawton, president-elect; W. K. Fauks, Oklahoma City, treasurer; and W. F. Irwin, Tulsa, secretary.

The forty-fifth annual meeting of the Oklahoma V.M.A. will be held at the Biltmore Hotel in Oklahoma City, Feb. 1-2, 1960.

s/W. F. IRWIN, *Secretary.*

Pennsylvania

Dr. Weaver Is Animal Pathologist at Tunkhannock.—Dr. George L. H. Weaver (API '40) has recently been appointed animal pathologist for the Tunkhannock regional diagnostic laboratory of the state's Bureau of Animal Industry.

It is one of five regional laboratories set up by the Bureau primarily to assist the Pennsylvania poultry industry in the diagnosis of poultry diseases.

Wyoming

State Association.—The Wyoming V.M.A. held its annual meeting at the Armory in Sheridan, June 14-15, 1959.

Officers of the Women's Auxiliary to the North Dakota V.M.A.
Left to right—Mrs. L. G. Best, past president; Mrs. J. L. Bringgold, treasurer, Mrs. Dean E. Flagg, vice-president; Mrs. R. C. Reed, president.

The Association's program included: Drs. L. K. Wayt, Colorado State University—enteric diseases of calves and foot disease in bulls; K. W. Smith, Colorado State University—small animal surgery and disease problems; James Tucker, University of Wyoming—results of research on pulmonary emphysema in cattle; William H. Breckenhauer, Norden Laboratories—leptospirosis; W. G. Huber, Charles Pfizer & Company—use of tranquilizers; and V. D. Stauffer, Arvada, Colo.—activities of the AVMA.

Dr. Brinton Swift, Buffalo, Wyo., served as moderator in a presentation of practice aids supplied by the conference attendees. Officers elected for the coming year are: Drs. Floyd E. Carroll, Laramie, president; W. R. Lee, Powell, vice-president; and J. F. Ryff, Laramie, secretary-treasurer.

Dr. R. E. Fuechel, Riverton, was elected a member of the executive board and Dr. L. N. Davidson, Sheridan, was honored by election to life membership in the state association.

s/J. F. RYFF, *Secretary.*

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Women's Auxiliary.—Officers of the Women's Auxiliary to the Wyoming V.M.A. elected at the June 14-15, 1959, meeting at Sheridan, are as follows: Mrs. John Simons, Torrington, president; Mrs. Bert Reinow, Pinedale, first vice-president; Mrs. Robert Baldwin, Gillette, second vice-president; Mrs. George N. Glover, Torrington, treasurer and membership, Mrs. Brinton L. Swift, Buffalo, secretary; and Mrs. W. R. Lee, Powell, historian.

s/J. F. RYFF, *Secretary to the Wyoming V.M.A.*

DEATHS

Star indicates member of AVMA

Howard S. Akin (COL '10), 67, Hanford, Calif., died June 5, 1959.

A native of Colorado, Dr. Akin moved to California in the early 1930's and practiced in Bakersfield. He later served as a state meat inspector.

For the past 17 years he had lived and practiced in Hanford until ill health forced his retirement two years ago.

Howard C. Groff (UP '18), late 70's, Cushing, Okla., who had been city veterinarian, for many years, died on June 4, 1959.

Illness had forced Dr. Groff into inactivity about two years ago. Prior to this, he had practiced in Cushing for 20 years.

Frederick J. Gallanough (ONT '89), 90, St. Petersburg, Fla., died in a hospital there, on June 1, 1959.

Born in Thornhill, Ont., Dr. Gallanough moved to St. Petersburg five years ago. He was the winner of more than 300 lawn bowling trophies and prizes.

★**Richard L. Houmes** (ISC '47), 34, Central City, Iowa, died March 26, 1959, after an illness of several weeks.

Dr. Houmes had practiced in Central City since 1947.

★**Frank E. Lentz** (UP '07), 71, Hatboro, Pa., who taught pharmacology, materia medica, and therapeutics for 47 years at the School of Veterinary Medicine, University of Pennsylvania, died July 8, 1959.

Born in Philadelphia in January, 1888, he received his preliminary education at Hatboro High School before entering the University of Pennsylvania. He was associated with the University until his retirement in 1954, at which time he held the rank of assistant professor.

★**Moss Parsons** (ONT '38), 42, Washington, D.C., died suddenly in June, 1959, from a heart attack.

Dr. Parsons was in small animal practice in Virginia before moving to the District of Columbia.

Albert G. Paddock (SF '12), Brawley, Calif., died in a hospital in LaGrande, Ore., May 28, 1959, following a heart attack.

Dr. and Mrs. Paddock had gone to Oregon to attend the funeral of a grandson. He had retired from practice in 1948.

J. W. Riley (KCV '08) Wright City, Mo., died May 24, 1959, after an illness of several months.

Dr. Riley was born, raised, and later practiced in and near the Wright City community.

Floyd E. Schneider (CVC '14), 74, Minocqua, Wis., died June 7, 1959, following a heart attack.

Dr. Schneider had formerly practiced in the Oregon-Madison area for many years. He had moved to Minocqua 11 years ago.

Oscar Max Vorthman (ISC '30), 52, Wauseon, Ohio, died May 23, 1959, following a long illness.

Born in Treynor, Iowa, he had been a resident of Wauseon for the last five years. He had been associated with the U.S. Department of Agriculture.

J. Alexander Webb (UP '16), 68, Pitman, N.J., died on July 2, 1959. An authority on milk production, sanitation, and repulations, he was vice-president and a member of the board of directors of Abbott's Dairies, Inc., of Philadelphia. He had been associated with Abbott's since 1924.

Born in Unionville, Pa., in 1891, Dr. Webb was a graduate of West Chester Norman School before enrolling in veterinary medicine at the University of Pennsylvania. He developed one of the first programs for tuberculine testing of dairy herds in Pennsylvania and New Jersey in 1925 and received the Franklin Award from the University that same year.

He was active in civic and professional affairs, had served on the finance and veterinary school committees, and this year was honorary chairman of the School's Seventy-Fifth Anniversary event's committee. He was a former AVMA member.

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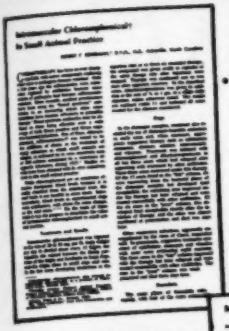

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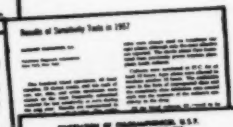

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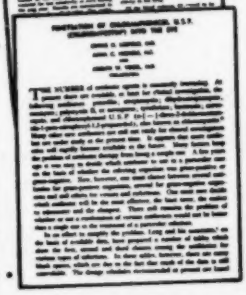

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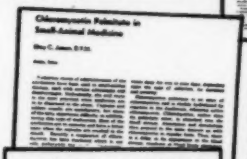

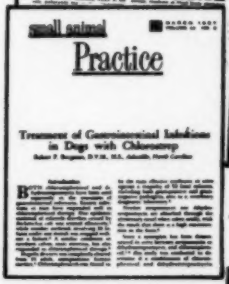

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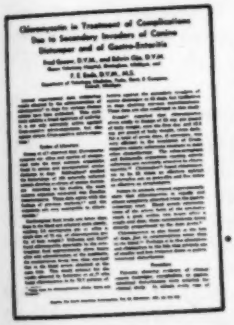

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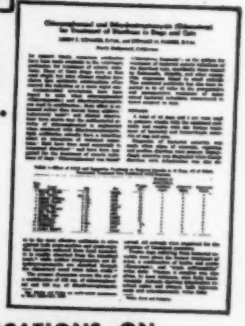

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in bacterial infections of the eye and ear, operative wounds, burns

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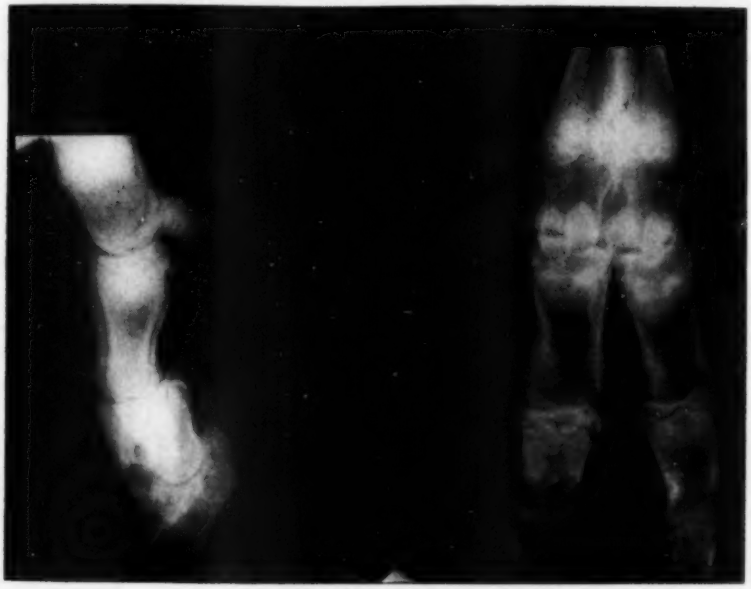

Figure 1

History.—A 4-month-old Charolais heifer had required two weeks of treatment of her left hindfoot for foot rot, using penicillin and a sulfonamide. When admitted to the hospital, there was swelling and suppuration above the coronary band of the medial digit. She was only slightly lame. Lateral and antero-posterior radiographs (fig. 1) were taken.

Here Is the Diagnosis

(Continued from preceding page)

Diagnosis.—Infectious arthritis with associated osteomyelitis in the medial digit of the left hindlimb of a calf, resulting in a vertical pathological fracture of the third phalanx.

Comment.—Extensive bone destruction was evident from the distal half of the second phalanx of the medial digit, extending into and obliterating the distal interphalangeal joint space. The entire third phalanx was also involved. The vertical fracture was considered secondary to the osteomyelitis.

Amputation of the digit proximal to the middle of the second phalanx resulted in an uncomplicated recovery.

This report was submitted by William D. Carlson, D.V.M., Ph.D., radiologist, College of Veterinary Medicine, Colorado State University, Fort Collins.

Our readers are invited to submit histories, radiographs, and diagnoses of interesting cases which are suitable for publication.

✦ ✦ ✦

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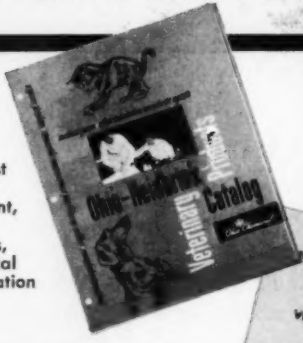

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REFERENCES: 1. Mosier, J. E., and Coles, E. H.: Vet. Med. **53**:649 (Dec.) 1958. 2. Belloff, G. B.: Calif. Vet. **9**:27 (Sept.-Oct.) 1956. 3. Mosier, J. E.: Vet. Med. **52**:445 (Sept.) 1957.

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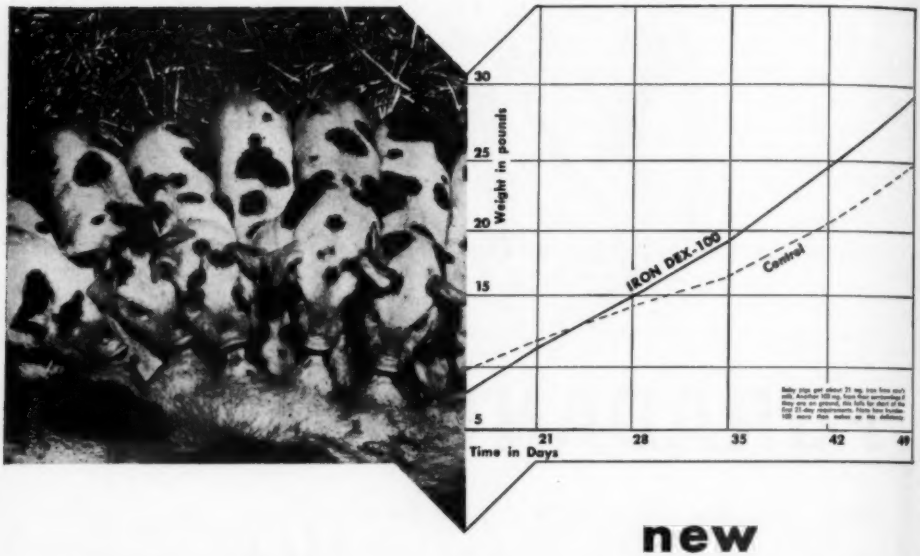

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Dr. Elden E. Leasure Voted President-Elect at Kansas City

Dr. Elden E. Leasure, dean of the School of Veterinary Medicine at Kansas State University, Manhattan, has been chosen President-Elect of the AVMA at the Association's Ninety-Sixth Annual meeting in Kansas City, Mo. Installation ceremonies were held Aug. 26, 1959.

A native of Solomon, Kan., Dr. Leasure was born Feb. 20, 1899. He graduated from Kansas State College (now a University) in 1923. After three years of general practice at Lawrence, Kan., in 1926, he joined his alma mater's faculty as an instructor in pathology. In 1930, he received the M.S. degree from Kansas State.

Dr. Leasure became professor of physiology in 1935; head of the Department of Physiology in 1944; and dean of the veterinary school in 1948.

In 1955, under his direction, Kansas State completed one of the most modern veterinary clinics in the country. He also directed the establishment of the Kansas State Foundation for Veterinary Medicine whose purpose is to develop, receive, and administer gifts to be used for the advancement of veterinary science.

Twice in recent years, Dr. Leasure has performed important assignments in India. In 1955, he spent three months as a member of an Indian-American team that surveyed the country's agriculture and educational and research programs in veterinary medicine.

In January of this year, he returned to India —this time to inspect the work of the Kansas State University team which is assisting India in its agricultural and veterinary medical programs under the International Cooperation Administration (I.C.A.) contract and to advise on the future of the I.C.A. programs.

Dr. Elden E. Leasure

Dr. Leasure was president of the Kansas V.M.A. in 1935, and since 1951, has been president of the Association of Deans of American Colleges and School of Veterinary Medicine. He has been a member of the AVMA since 1928.

Among his other affiliations are: the U. S. Livestock Sanitary Association, the Research Workers of North America, Sigma Xi, Gamma Sigma Delta, and Phi Kappa Phi. In addition, he is the author of numerous papers covering research on feline infectious enteritis, anaplasmosis, equine encephalomyelitis, and bovine allergic dermatitis.

Dr. and Mrs. Leasure reside at 318 S. 17th St., in Manhattan. Mrs. Leasure currently is recorder for the Women's Auxiliary to the AVMA.

Travel Schedule for AVMA Officers and Staff

(September 16-December 1, 1959)

Sept. 16, *Iowa State College Student Chapter,* S. F. Scheidy

Sept. 21-25, Washington, D.C.—*Extension Veterinarian Workshop,* H. E. Kingman, Jr.

Sept. 28-29, Tifton, Ga.—*Georgia Coastal Plain Conference,* J. O. Knowles

Oct. 1-2, Philadelphia, Pa.—*Pennsylvania V.M.A.,* S. F. Scheidy

Oct. 10-11, Chicago, Ill.—*Board of Governors*

Oct. 7-9, Auburn, Ala.—*Council on Education,* J. R. Hay, N. W. Pieper, T. L. Jones, W. E. Jennings, H. J. Stafseth

Oct. 13, *District of Columbia V.M.A.,* S. F. Scheidy

Oct. 16-17, Denver, Colo.—*Section Officer Meeting*

Oct. 18-19, Abilene, Texas—*Texas V.M.A.,* D. A. Price

Oct. 19-23, Nashville, Tenn.—*National Association of State Departments of Agriculture,* J. R. Hay

Nov. 3, *Kankakee, Ill. V.M.A.,* J. R. Hay

Nov. 1-4, Baltimore, Md.—*Southern V.M.A.,* S. F. Scheidy

Nov. 8, Boston, Mass.—*Executive Board District Meeting* (Dist. I), M. G. Fincher, H. E. Kingman, Jr., J. R. Hay, D. A. Price, B. M. Forster

Nov. 7-11, Boston, Mass.—*New England V.M.A.*—Statler-Hilton, S. F. Scheidy

Nov. 11-13, Athens, Ga.—*Council on Education,* J. R. Hay, J. E. Greene, H. L. Marsh, T. L. Jones, C. K. Mingle

Nov. 19-20, Ames, Iowa—*National Swine Industry Conference,* J. R. Hay, H. E. Kingman

Nov. 21-22, Chicago, Ill.—*V.M.A. Secretaries Conference*

Nov. 23-24, Chicago, Ill.—*Board of Governors*

Dec. 1-3, Lincoln, Neb.—*Nebraska V.M.A.,* E. E. Leasure

1868

The semiannual meeting for 1868 in New York was graced by the presence of Professor John Gamgee of Scotland, who was investigating contagious diseases of animals in this country for the U.S. government. At this meeting a committee, including Alexandre Liautard, was appointed "to investigate the subject of printing a veterinary journal." The matter was apparently a decade in advance of its time, for the subject does not appear to have been discussed again until 1876. It was decided to drop from the membership any who were two years in arrears in dues.

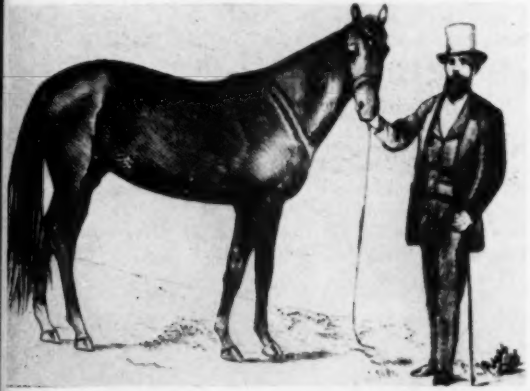
At the annual meeting in Boston, I. S. Lombard and James L. Robertson were admitted to membership. Robertson was destined to become secretary and, later, president of the U.S.V.M.A. The resignation of past-president Curtis was accepted, whereupon he was made the first honorary member of the Association.

The Association adopted a resolution:

> THAT the United States Veterinary Medical Association as a body protest against the appointment by the general government, through the recommendation of General Grant, of Mr. Alexander Dunbar as a clinical lecturer to the army veterinary surgeons and farriers, for an alleged discovery of a mode of treatment of the diseases of horses' feet, the operation being no discovery, but a regeneration of an obsolete idea, and worthy of the attention and patronage of the Society for the Prevention of Cruelty to Animals, it being both an evidence of ignorance and barbarity. Furthermore, Mr. Dunbar has no claim whatever to the title of Veterinary Surgeon, either by education or professional association.

Dunbar was an honest Canadian farmer who had made a small fortune on a method of treating the feet of lame horses. He did not claim to be a veterinarian, but was "elevated" to this status by act of Congress. Except for the objections of one congressman, Dunbar would have been paid $25,000 for one year's service, but this was reduced to $10,000. Although army veterinarians called the system of treatment "foot butchery," Dunbar's method remained in effect for 15 years. Whether the action of the U.S.V.M.A. had any effect or not is not certain, but Stein, Busteed, and Liautard are thought to have had a hand in supplying the information which resulted in reduction of Dunbar's honorarium. The resolution of the Association is at least worthy of note as an early attempt to assert influence on a national basis for the betterment of veterinary medicine.

Alexander Dunbar, originator of the "Dunbar system" for treating contracted feet in the horse.



+ + +

ROBERT WOOD, V.S., fifth president of the U.S.V.M.A., had been associated with George Dadd both at the Boston Veterinary Institute as professor of cattle pathology, and as a contributor to the *American Veterinary Journal*. He was characterized as "a fair student, and had a capacity for the proper gathering and storing of knowledge. He reasoned better than his brother, was deeper and more analytical, while Charles leaned more toward the synthetical. . . . He was a good friend, an all-round useful man of far more than excellent ability . . . anxious and ready to do all he could in behalf of his profession."

Wood practiced at Lowell, Mass., and apparently took private students about the same time he was associated with the Boston school. Both he and his brother were active in the Boston Veterinary Association from the late 1850's, and were the only pair of brothers to attain the U.S.V.M.A. presidency.

Robert Wood was perhaps less scholarly than his brother Charles, but evidently was a more progressive practitioner. He mentions using ether anesthesia for castrating pigs with scrotal hernia and for other operations in the 1850's—when few veterinarians were using anesthesia.

In writing on "Catarrh in Neat Cattle, alias Horn Ail," he comments on the usual absurdities connected with the disease, but adds: "I must confess, however, this is not as frequently the case, now as heretofore, the people generally appreciating more and more the value of our art . . . where one animal dies in this city and vicinity, at this time, there were ten, twelve or fifteen years ago." This would suggest that he had been in practice since the middle 1840's.

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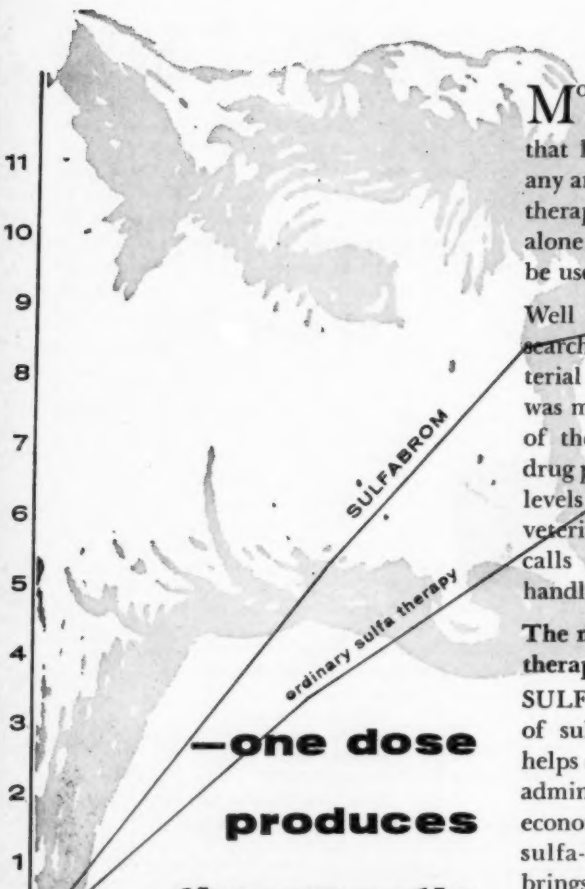

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COMING MEETINGS

Notices of coming meetings must be received 30 days before date of publication.

New York State Veterinary Medical Society. Annual meeting. Grossinger's, Grossinger, N.Y., Sept. 16-18, 1959. F. H. Fox, chairman.

South Dakota Veterinary Medical Association. Annual meeting. Sheraton-Johnson Hotel, Rapid City, S. Dak., Sept. 17-18, 1959. Glenn E. Duncan, Tyndall, secretary.

New Mexico Veterinary Medical Association. Annual meeting. Western Skies Hotel, Albuquerque, N. M., Sept. 21-22, 1959. E. R. Leslie, 907 Alamosa, Carlsbad, N.M., secretary.

Pennsylvania State Veterinary Medical Association. Annual meeting. (Combined with the University of Pennsylvania School of Veterinary Medicine's Seventy-Fifth Anniversary celebration). Bellevue-Stratford Hotel, Philadelphia, Pa., Oct. 1-3, 1959. R. C. Snyder, Walnut St. and Copley Rd., Upper Darby, Pa., secretary.

Florida State Veterinary Medical Association. Annual meeting. Hillsboro Hotel, Tampa, Fla., Oct. 4-6, 1959. M. W. Emmel, P.O. Box 340, Gainesville, Fla., executive secretary.

Purdue University. Forty-seventh annual conference for veterinarians. Purdue University, Lafayette, Oct. 7-9, 1959.

Eastern Iowa Veterinary Association, Inc. Forty-sixth annual meeting. Roosevelt Hotel, Cedar Rapids, Oct. 15-16, 1959. C. B. Thayer, Medical College, State University of Iowa, Iowa City, Iowa.

American Public Health Association. Annual meeting. Atlantic City, N.J., Oct. 19-23, 1959. Ernest S. Tierkel, Communicable Disease Center, 50 Seventh St., N.E., Atlanta 23, Ga., correspondent.

Interstate Veterinary Medical Association. Annual meeting. Sioux City, Iowa, Oct. 22-23, 1959. Dr. Don Rubel, 3209 38th St., Sioux City, secretary.

Iowa State College. Eleventh annual veterinary homecoming luncheon. Iowa State College, veterinary courtyard, Ames, at 11:00 a.m., Oct. 24, 1959. Roger Schladetzky, correspondent.

Animal Care Panel. Annual Convention. Sheraton Park Hotel, Washington, D.C., Oct. 29-31, 1959. William I. Gay, Animal Care Panel, 2101 Constitution Ave., Washington 25, D.C., publicity committee chairman.

Southern and West Virginia Veterinary Medical Associations. Combined meeting. Lord Baltimore Hotel, Baltimore, Md., Nov. 1-4, 1959. A. A. Husman, P. O. Box 91, Raleigh, N. Car., secretary, Southern V.M.A., and H. J. Fallon, 200 5th St., W. Huntington, W. Va., secretary, West Virginia V.M.A.

Missouri, University of. Thirty-fifth annual veterinary conference. University of Missouri, School of Veterinary Medicine, Columbia, Nov. 2-3, 1959. Cecil Elder, chairman.

New England Veterinary Medical Association, the Massachusetts Veterinary Association, and Region I of the American Animal Hospital Association. Combined meeting. Statler Hilton Hotel, Boston, Mass., Nov. 7-11, 1959. Dr. Frederick G. Ruder, Jr., 300 N. Pleasant St., Amherst, Mass., president, New England V.M.A. and Massachusetts V.A.

Midwest Feed Manufacturers' Association. Second conference. Kansas City, Mo., Nov. 30-Dec. 1, 1959.

Veterinary-Nutrition Conference. Second annual meeting. President Hotel, Kansas City, Mo., Nov. 30—Dec. 1, 1959. This conference is sponsored jointly by the Iowa, Kansas, Missouri, and Nebraska Veterinary Medical Associations and the Midwest Feed Manufacturers' Association.

United States Livestock Sanitary Association. Sixty-third annual meeting. Sheraton-Palace Hotel, San Francisco, Calif., Dec. 15-18, 1959. R. A. Hendershott, 33 Oak Lane, Trenton, N.J., secretary.

Kansas Veterinary Medical Association. Fifty-sixth annual convention. Hotel Broadview, Wichita, Jan. 10-12, 1960. Melvin W. Osburn, 1525 Humboldt, Manhattan, Kan., secretary.

Intermountain Veterinary Medical Association. Annual meeting. Hotel Utah, Salt Lake City, Jan. 20-22, 1960. For information contact: Dr. Douglas H. McKelvie, 1220 South State St., Salt Lake City, Utah, or Dr. R. A. Bagley, 4600 Creek View Dr., Murray, Utah.

Minnesota State Veterinary Medical Society. Annual meeting. Hotel St. Paul, St. Paul, Minn., Jan. 25-27, 1960. B. S. Pomeroy, University of Minnesota, College of Veterinary Medicine, St. Paul 1, Minn., secretary.

Oklahoma Veterinary Medical Association. Forty-fifth annual meeting. Biltmore Hotel, Oklahoma City, Feb. 1-2, 1960. W. F. Irwin, 3550 South Peoria Ave., Tulsa, Okla., secretary.

Foreign Meetings

International Association of Veterinary Food Hygenists. Second Symposium. Basel, Switzerland, May 15-21, 1960. Dr. A. Clarenburg, 1, Sterrenbos, Utrecht, The Netherlands, president.

Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Medical Association, the first Thursday of each month. James L. Chambers, 4307 Normanbridge Rd., Montgomery, Ala., secretary-treasurer.

Jefferson County Veterinary Medical Association, the second Thursday of each month. Dan P. Griswold, Jr., 714 S. 39th St., Birmingham, secretary.

Mobile-Baldwin Veterinary Medical Association, the third Tuesday of each month. Cecil S. Yarbrough, 4121 U.S. 90 West, Mobile, Ala., secretary.

Northeast Alabama Veterinary Medical Association, the second Tuesday of every other month. Leonard J. Hill, P.O. Box 761, Gadsden, Ala., secretary-treasurer.

ALASKA—Anchorage Group of the Alaska V. M. A. the last Wednesday of each month at Fort Richardson Officers' Club or Thompson's Restaurant 6th and I Streets, Anchorage, Alas. Lt. Colonel E. H. Akins, Surgeon's Office, U.S.A.R.A.L., Fort Richardson, Alas., secretary to the Alaska V. M. A.

ARIZONA—Central Arizona Veterinary Medical Association, the second Tuesday of each month. J. W. Langley, Jr., P.O. Box 5013, Phoenix, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the

third Wednesday of each month at 7:30 p.m. Gwyn Chapin, 2215 E. Calle Vista, Tucson, Ariz., secretary.

ARKANSAS—Pulaski County Veterinary Medical Society, the second Tuesday of each month. Harvie R. Ellis, 54 Belmont Drive, Little Rock, Ark., secretary-treasurer.

CALIFORNIA—Alameda-Contra Costa Veterinary Medical Association, the fourth Wednesday of Jan., March, May, June, Aug., Oct., and Nov. John S. Blackard, 420 Appian Way, Richmond, Calif., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of February, April, July, September, and December. Herb Warren, 3004 16th St., San Francisco, Calif., executive secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Paul S. Chaffee, 2333 McKinley Ave., Fresno, Calif., secretary.

Humboldt-Del Norte Counties Veterinary Medical Association, the second Tuesday of January, May, September, and November. Dr. M. Lunstra, P. O. Box 734, Eureka, Calif., secretary-treasurer.

Kern County Veterinary Medical Association, the first Thursday evening of the month. James L. Frederickson, 17 Nile St., Bakersfield, Calif., secretary-treasurer.

Mid-Coast Veterinary Medical Association, the first Thursday of each month. William P. Matulich, P. O. Box 121, San Luis Obispo, Calif., secretary-treasurer.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. V. Todorovic, 47 Mann Ave., Watsonville, Calif., secretary.

Northern California Association of Veterinarians, the second Tuesday of the month. Andrew F. Giambroni, P. O. Box 782, Red Bluff, Calif., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell, in Modesto, Calif. T. J. Carleton, 325 W. Lockeford St., Lodi, Calif., secretary-treasurer.

Orange Belt Veterinary Medical Association, the second Monday of each month. R. Y. Foos, P.O. Box 955, Victorville, Calif., secretary-treasurer.

Orange County Veterinary Medical Association, the third Thursday of each month. H. M. Stanton, 1122 S.E. U.S. Highway 101, Tustin, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of the month. R. M. Grandfield, 416 Stephens Rd., San Mateo, Calif., secretary-treasurer.

Redwood Empire Veterinary Medical Association, the third Thursday of the month. R. R. Rediske, 833 Vallejo Ave., Novato, Calif., secretary-treasurer.

Sacramento Valley Veterinary Medical Association, the second Wednesday of the month. E. C. Story, 4819 "V" St., Sacramento 17, Calif., secretary-treasurer.

San Diego County Veterinary Medical Association, the fourth Tuesday of the month. Robert F. Burns, 7572 North Ave., Lemon Grove, Calif., secretary-treasurer.

San Fernando Valley Chapter SCVMA, the second Tuesday of each month at 7:30 p.m., Hody's Restaurant, North Hollywood, Calif. Barbara G. Shirley, Canoga Park, Calif., secretary-treasurer.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at the Casa Escobar Restaurant in Studio City. John Chudacoff, 7912 Sepulveda Blvd., Van Nuys, Calif., sceretary.

Santa Barbara-Ventura Counties Veterinary Medical Association, every three months, no set date. Gerald M. Clark, 5415 8th St., Carpinteria, Calif., secretary-treasurer.

Santa Clara Valley Veterinary Medical Association, the last Tuesday of the month. Robert L. King, 1269 Grant St., Santa Clara, Calif., secretary-treasurer.

Southern California Veterinary Medical Association, the third Wednesday of the month. Mr. Don Mahan, 1919

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1. Osborne, J. C. *in* New Horizons in Chemotherapy. Proceedings of First Regional Conference on the Nitrofurans in Veterinary Medicine. In press.
2. Bull, W. S.: N. Amer. Vet. 38: 3 (Jan.) 1957.

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1. Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: Vet. Med. 51:413 (Sept.) 1956.

prevention of uterine infection— early restoration of fertility in over 90% of treated cows[1]

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Wilshire Blvd., Los Angeles 57, Calif., executive secretary.

COLORADO—Denver Area Veterinary Medical Society, the fourth Tuesday of every month. Gene M. Bierhaus, 2896 S. Federal Blvd., Englewood, Colo., secretary-treasurer.

Northern Colorado Veterinary Medical Society, the first Wednesday of each month, in Fort Collins. Dr. James Voss, Veterinary Hospital, Colorado State University, Fort Collins, Colo., secretary.

DELAWARE—New Castle County Veterinary Medical Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. A. P. Mayer, Jr., R.F.D. 2, Newark, Del., secretary-treasurer.

DISTRICT OF COLUMBIA—District of Columbia Veterinary Medical Association, the second Tuesday evenings of January, March, May, and October. R. B. Gochenour, 10109 Ashwood Dr., Kensington, Md., secretary-treasurer.

FLORIDA—Big Bend Veterinary Medical Association, meets the first Sunday of each month at 5:00 p.m. at the Tallahassee Dining Room, Tallahassee. C. Paul Vickers, P.O. Box 309, Tallahassee, secretary.

Central Florida Veterinary Medical Association, the first Friday of each month at 8:00 p.m., place specified monthly. L. R. Poe, 753 W. Fairbanks Ave., Winter Park, Fla., secretary-treasurer.

Florida West Coast Veterinary Medical Association, the second Wednesday of each month at the Lighthouse Inn, St. Petersburg, Fred Jones, 3606 S. Dale Mabry, Tampa, Fla., secretary.

Hillsborough County Veterinary Medical Society, the second Monday evening of each month. For additional information as to the location of each meeting, contact: J. J. Metz, Jr., 5207 Nebraska Ave., Tampa 3, Fla., secretary.

Jacksonville Veterinary Medical Association, the first Thursday of every month. Dodson's Restaurant, Stephen C. Hite, 5807 105th St., Jacksonville 10, Fla., secretary.

Northwest Florida Veterinary Medical Society, third Wednesday of each month, time and place specified monthly. John Webb, P.O. Box 183, Cantonment, Fla., secretary-treasurer.

Palm Beach Veterinary Society, the last Thursday evening of each month. McArthur Dairy Building, Four Points, W. Palm Beach. B. W. Bigger, 2833 S. 4th St., Fort Pierce, Fla., secretary.

Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. John S. Haromy, Route #1, Box 107-A, Lake Wales, Fla., secretary.

South Florida Veterinary Society, the third Wednesday of each month. Time and place specified monthly. Joe B. O'Quinn, 1690 E. 4th, Hialeah, Fla., secretary.

Suwanee Valley Veterinary Association, the fourth Tuesday of each month, Hotel Thomas, Gainesville. G. L. Burch, P.O. Box 405, Ocala, Fla., secretary-treasurer.

Volusia County Veterinary Medical Association, the fourth Thursday of each month. Robert E. Cope, 127 E. Mason, Daytona Beach, Fla., secretary.

GEORGIA—Atlanta Veterinary Medical Society, the third Thursday of each month at the Elk's Home, 726 Peachtree St., Atlanta. Clare L. Bromley, 634 Northside Dr., N.W., Atlanta, Ga., secretary.

Georgia-Carolina Veterinary Medical Association, the second Monday of each month at 8:00 p.m., at the Town Tavern, Augusta, Ga. J. A. Schmitz, 1711 Gwinnett St., Augusta, Ga., secretary.

North Georgia Veterinary Medical Association, quarterly, no set date, the spring meeting at the Veterinary School, Athens, Ga. S. J. Shirley, Commerce, Ga., secretary.

Southeast Georgia Veterinary Medical Association, quarterly, date and meeting place varies. Hugh F. Arundel, P.O. Box 153, Statesboro, Ga., secretary.

South Georgia Veterinary Medical Association, the second Sunday of each quarter at 3:30 p.m., at the Radium Springs Hotel, Albany, Ga. M. W. Hale, Route 2, Tifton, Ga., secretary.

ILLINOIS—Central Illinois Veterinary Medical Association, June 9, Sept. 9, and Dec. 10, 1959. Paul B. Doby, 4 Owens Lane, Springfield, secretary.

Chicago Veterinary Medical Association, the second Tuesday of each month, Charles H. Armstrong, 1021 Davis St., Evanston, secretary.

INDIANA—Calumet Area Veterinary Medical Association, the first Thursday of each month. Bruce Sharp, Box 166, Hobart, Ind., secretary-treasurer.

Central Indiana Veterinary Medical Association, the second Wednesday of each month. P. T. Parker, 224 N. Mill St., Plainfield, Ind., secretary-treasurer.

Michiana Veterinary Medical Association, the second Thursday of every month except July and December, at the Hotel LaSalle, South Bend, Ind. Stanton Williamson, 217 W. Chippewa St., South Bend, Ind., secretary.

Tenth District Veterinary Medical Association, the third Thursday of each month. J. S. Baker, P.O. Box 52, Pendleton, Ind., secretary.

IOWA—Cedar Valley Veterinary Medical Association, the second Monday of each month, except January, July, August, and October in Black's Tea Room, Waterloo, Iowa. A. J. Cotten, P.O. Box 183, Grundy Center, secretary.

Central Iowa Veterinary Medical Association, the third Monday of each month except June, July, and August at 6:30 p.m., Breeze House, Ankeny, Iowa. S. L. Hendricks, secretary-treasurer.

Coon Valley Veterinary Medical Association, the second Wednesday of each month, September through May, at 7:30 p.m., Cobblestone Inn, Storm Lake, Iowa. Robert McCutcheon, Holstein, secretary.

East Central Iowa Veterinary Medical Society, the Second Thursday of each month at 6:30 p.m., usually in Cedar Rapids, Iowa. T. F. Bartley, P.O. Box 454, Cedar Rapids, secretary.

Fayette County Veterinary Medical Association, the third Thursday of each month at 6:30 p.m. in West Union, Iowa. H. J. Morgan, West Union, secretary.

Lakes Veterinary Association, the first Tuesday of each month, September through May, at 6:30 p.m., at the Gardson Hotel, Estherville, Iowa. Barry Barnes, P.O. Box 162, Milford, secretary.

North Central Iowa Veterinary Medical Association, the third Thursday of April, at the Warden Hotel, Fort Dodge, Iowa. H. Engelbrecht, P. O. Box 797, Fort Dodge, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Wisneslick Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northwest Iowa Veterinary Medical Association, the second Tuesday of February, May, September, and December, at the Community Bldg., Sheldon. W. Ver Meer Hull, secretary.

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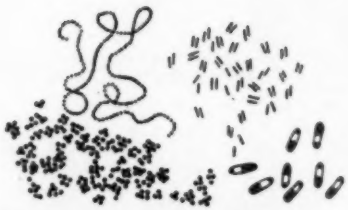

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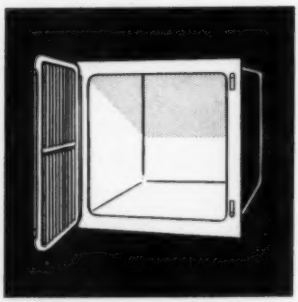

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day of each month at Mt. Pleasant, Iowa. Warren Kilpatrick, Mediapolis, secretary.

Southwestern Iowa Veterinary Medical Association, the first Tuesday of April and October, Hotel Chieftain, Council Bluffs, Iowa. J. P. Stream, 202 S. Stone St., Creston, secretary.

Upper Iowa Veterinary Medical Association, the third Tuesday of each month at 7:00 p.m., at All Vets Center, Clear Lake, Iowa. W. A. Danker, Dows, Iowa, secretary.

KENTUCKY—Central Kentucky Veterinary Medical Association, the first Wednesday of each month. R. H. Folsom, P.O. Box 323, Danville, Ky., secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday of each month in Louisville or within a radius of 50 miles, except January, May, and July. G. R. Comfort, 2102 Reynolds Lane, Louisville, Ky., secretary-treasurer.

LOUISIANA—New Orleans Veterinary Medical Association, the third Thursday of every month at the Monte leone Hotel, New Orleans, at 8:30 p.m. Ronald C. Francis, 6421 Chef Menteur Highway, New Orleans, La., secretary-treasurer.

MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m., at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Leonard D. Krinsky, 6111 Hartford Rd., Baltimore, Md., secretary.

MICHIGAN—Central Michigan Veterinary Medical Association, the first Wednesday of every month at 7 p.m. Jerry Fries, 2070 E. Main St., Owosso, Mich., secretary.

Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert W. Acton, 4110 Spring Rd., Jackson, Mich.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. Alvin R. Conquest, P.O. Box 514, Grand Blanc, Mich., secretary.

Southeastern Michigan Veterinary Medical Association, the fourth Wednesday of every month, September through May. Louis J. Rossoni, 24531 Princeton Ave., Dearborn 8, Mich., secretary.

MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of each month (except July and August), at the Coronado Hotel, Lindell Blvd. and Spring Ave., St. Louis, Mo., at 8 p.m. Edwin E. Epstein, 4877 Natural Bridge Ave., St. Louis 15, Mo., secretary.

Kansas City Veterinary Medical Association and Kansas City Small Animal Hospital Association, the third Thursday of each month at the Hotel President, Kansas City, Mo. Robert E. Guilfoil, 18 N. 2nd St., Kansas City 18, Kan., secretary.

NEVADA—Western Nevada Veterinary Society, the first Tuesday of each month. Paul S. Silva, 1170 Airport Road, Reno, Nev., secretary.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, R.D. 1, Box 284A, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April, except December, at the Irvington House, 925 Springfield Ave., Irvington, N.J. Bernard M. Weiner, 787 Clinton Ave., Newark, N.J., secretary.

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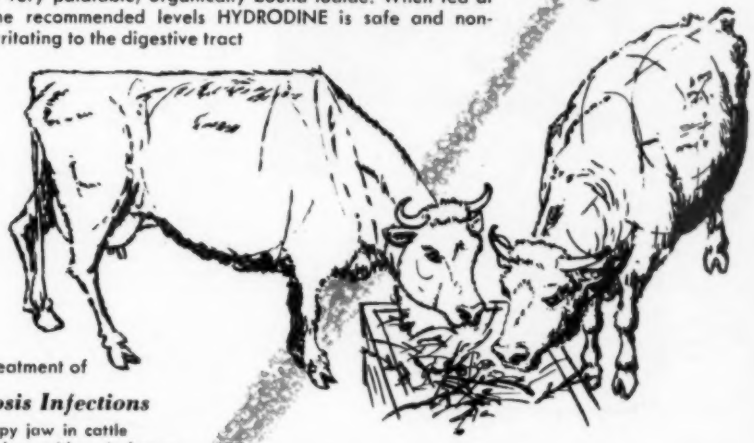

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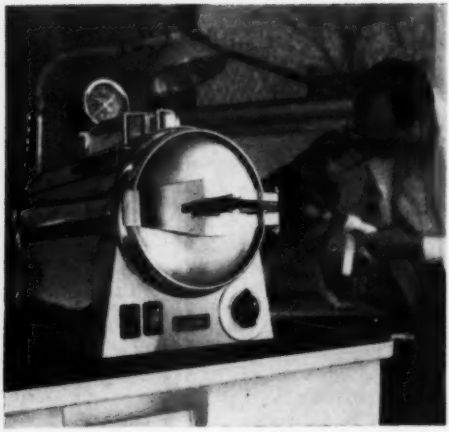

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Tuesday of each month at the Elks Club, Hackensack. James R. Tanzola, Upper Saddle River, N.J., secretary.

Northwest Jersey Veterinary Society, the third Wednesday of every odd month. G. L. Smith, P.O. Box 938, Trenton, N.J., secretary.

South New Jersey Veterinary Medical Association, the fourth Tuesday of each month at the Collmont Diner, Collingswood, N.J. Marvin Rothman, 718 Dwight Ave., Collingswood, N.J., secretary.

NEW MEXICO—Bernalillo County Veterinary Practitioners Association, the third Wednesday of each month, Fez Club, Albuquerque, Donald W. Fitzgerald, 1825 Lomas Blvd., N.E., Albuquerque, N.M., secretary-treasurer.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel, Greensboro. C. G. Sims, 2450 Battleground Ave., Greensboro, N. Car., secretary.

Eastern North Caroline Veterinary Medical Association, the last Tuesday evening of each month, time and place specified monthly. Byron H. Brow, Box 453, Goldsboro, N. Car., secretary-treasurer.

Piedmont Veterinary Medical Association, the last Friday of each month. J. G. Martin, Boone, N. Car., secretary.

Twin Carolinas Veterinary Medical Association, the third Friday of each month at Orange Bowl Restaurant, Rockingham, N. Car., at 7:30 p.m. J. E. Currie, 690 N. Leak St., Southern Pines, N. Car., secretary.

Western North Carolina Veterinary Medical Association, the second Thursday of every month at 7:00 p.m. in the George Vanderbilt Hotel, Asheville, N. Car. Vita Lind, 346 State St., Marion, N. Car., secretary.

OHIO—Cincinnati Veterinary Medical Association, the third Tuesday of every month at Shuller's Wigwam, 6210 Hamilton Ave., at North Bend Road. G. C. Lewis, 451 E. Galbraith Rd., Cincinnati, Ohio, secretary-treasurer.

Columbus Academy of Veterinary Medicine, every month, September through May. E. M. Simonson, 3120 Valley View Dr., Columbus, Ohio, secretary-treasurer.

Cuyahoga County Veterinary Medical Association, the first Wednesday in September, October, December, February, March, April and May, at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. F. A. Coy, 8208 Carnegie Ave., Cleveland, Ohio, secretary.

Dayton Veterinary Medical Association, the third Tuesday of every month. O. W. Fallang, 6941 Far Hills Ave., Dayton, secretary.

Killbuck Valley Veterinary Medical Association, the first Wednesday of alternate months beginning with February. C. Gale, Wooster, Ohio, secretary-treasurer.

Mahoning County Veterinary Medical Association, the Fourth Tuesday of each month, at 9:00 p.m. Youngstown Maennerchor Club, Youngstown, Ohio. Sam Segall, 2935 Glenwood Ave., Youngstown, secretary.

Miami Valley Veterinary Medical Association, the first Wednesday of December, March, June, and September. J. M. Westfall, Greenville, Ohio, secretary-treasurer.

North Central Ohio Veterinary Medical Association, the last Wednesday of each month except during the summer. R. W. McClung, Tiffin, Ohio, secretary-treasurer.

Northwestern Ohio Veterinary Medical Association, the last Wednesday of March and July. C. S. Alvanos, 1683 W. Bancroft St., Toledo, Ohio, secretary-treasurer.

Stark County Veterinary Medical Association, the second Tuesday of every month, at McBrides Emerald Lounge, Canton, Ohio. M. L. Willen, 4423 Tuscarawas St., Canton, Ohio, secretary.

Summit County Veterinary Medical Association, the last Tuesday of every month (except June, July, and August), at the Mayflower Hotel, Akron, Ohio. M. L. Scott, 42 W. Market St., Akron, Ohio, secretary-treasurer.

Tri-County Veterinary Medical Association, the fourth Wednesday of January, May, and September. Mrs. R. Slusher, Mason, Ohio, secretary-treasurer.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month, 7:30 p.m., Patrick's Foods Cafe, 1016 N.W. 23rd St., Oklahoma City. Claude A. Tigert, 3032 N.W. 68th St., Oklahoma City, Okla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month at the City-County Health Building, 4616 E. 15th St., Tulsa, Okla. Arlen D. Hill, 5302 E. 11th St., Tulsa, Okla., secretary.

Tulsa Association of Small Animal Veterinarians, first and third Mondays. City-County Health Dept. T. E. Messler, 3104 E. 51st St., Tulsa, Okla., secretary.

OREGON—Portland Veterinary Medical Association, the second Tuesday of each month, at 7:30 p.m. Ireland's Restaurant, Lloyds, 718 N.E. 12th Ave., Portland. Donald L. Moyer, 8415 S.E. McLoughlin Blvd., Portland 2, Ore., secretary.

Willamette Veterinary Medical Association, the third Tuesday of each month, except July and August, at the Marion Hotel, Salem. Robert J. Mallorie, P.O. Box 155, Silverton, Ore., secretary.

PENNSLYVANIA—Keystone Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania School of Veterinary Medicine. Raymond C. Snyder, N.E. Corner 47th St. and Hazel Ave., Philadelphia 43, Pa., secretary.

Lehigh Valley Veterinary Medical Association, the first Thursday of each month. Stewart Rockwell, 10th and Chestnut Sts., Emmaus, Pa., secretary.

Pennsylvania Northern Tier Veterinary Medical Association, the third Wednesday of each odd numbered month. R. L. Michel, Troy, Pa., secretary.

SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

Georgia-Carolina Veterinary Medical Association—see GEORGIA.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. Jack E. Habluetzel, Route 1, Box 65-N, Ingleside, Texas, secretary.

Dallas County Veterinary Medical Association, the first Tuesday of each month at 7:30 p.m., at a place to be specified. Frank N. Black, 12830 Preston Rd., Dallas, Texas, corresponding secretary.

UTAH—Salt Lake Small Animal Hospital Association, the first Monday of every month, at the Holiday Inn, 3040

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South State St., Salt Lake City, at 12:15 p.m. Douglas H. McKelvie, 1220 S. State St., Salt Lake City, Utah, secretary-treasurer.

VIRGINIA—Central Virginia Veterinary Association, the second Thursday of each month at 8:00 p.m., except July and August, at a place in Richmond to be announced monthly. Edwin M. Crawford, secretary-treasurer.

Northern Virginia Veterinary Conference Association, the second Tuesday of each month. T. P. Koudelka, P.O. Box 694, Harrisonburg, Va., secretary.

Northern Virginia Veterinary Society, the second Wednesday of every third month. Meeting place announced by letter. H. C. Newman, Box 145, Merrifield, secretary.

Southwestern Virginia Veterinary Medical Association, the first Thursday of each month. D. F. Watson, Blacksburg, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Monday of each month, Magnolia American Legion Hall, 2870 32nd W., Seattle. Roy C. Toole, 10415 Main St., Bellevue, secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. B. D. Benedictson, 3712 Plummer St., Olympia, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the third Thursday of each month in the Hotel Pritchard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W. Huntington, W. Va., secretary.

WISCONSIN—Central Wisconsin Veterinary Medical Association, the second Tuesday of each quarter (March, June, Sept., Dec.) C. R. Carlson, 1109 E. LaSalle Ave., Barron, Wis., secretary.

Coulee Region Veterinary Medical Association, the third Wednesday of every other month. F. N. Petersen, Box 127, Cashton, Wis., secretary.

Dane County Veterinary Medical Association, the second Thursday of each month. Dr. E. P. Pope, 409 Farley Ave., Madison, Wis., secretary.

Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. Dr. Raymond Pahle, 10827 W. Oklahoma Ave., Milwaukee, Wis.

Northeastern Wisconsin Veterinary Medical Association, the third Wednesday in April. William Madson, 218 E. Washington St., Appleton. Wis., secretary.

Rock Valley Veterinary Medical Association, the first Wednesday of each month. L. C. Allenstein, 209 S. Taft St., Whitewater, Wis., secretary.

Southeastern Veterinary Medical Association, the third Thursday of each month. John R. Curtis, 419 Cook St., Portage, Wis., secretary.

Wisconsin Valley Veterinary Medical Association, the second Tuesday of every other month. John B. Fleming, 209 E. 4th St., Marshfield, Wis., secretary.

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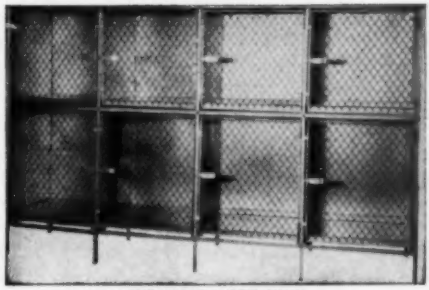

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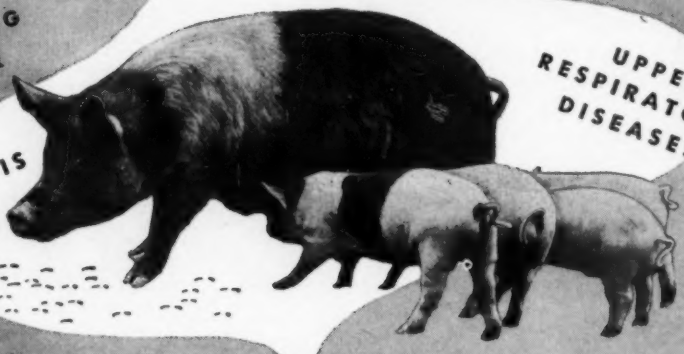

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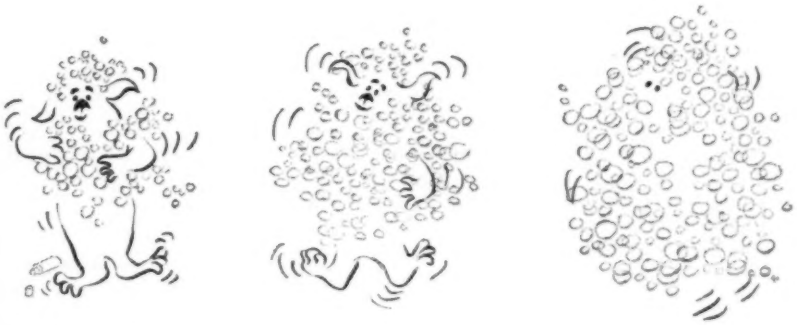

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